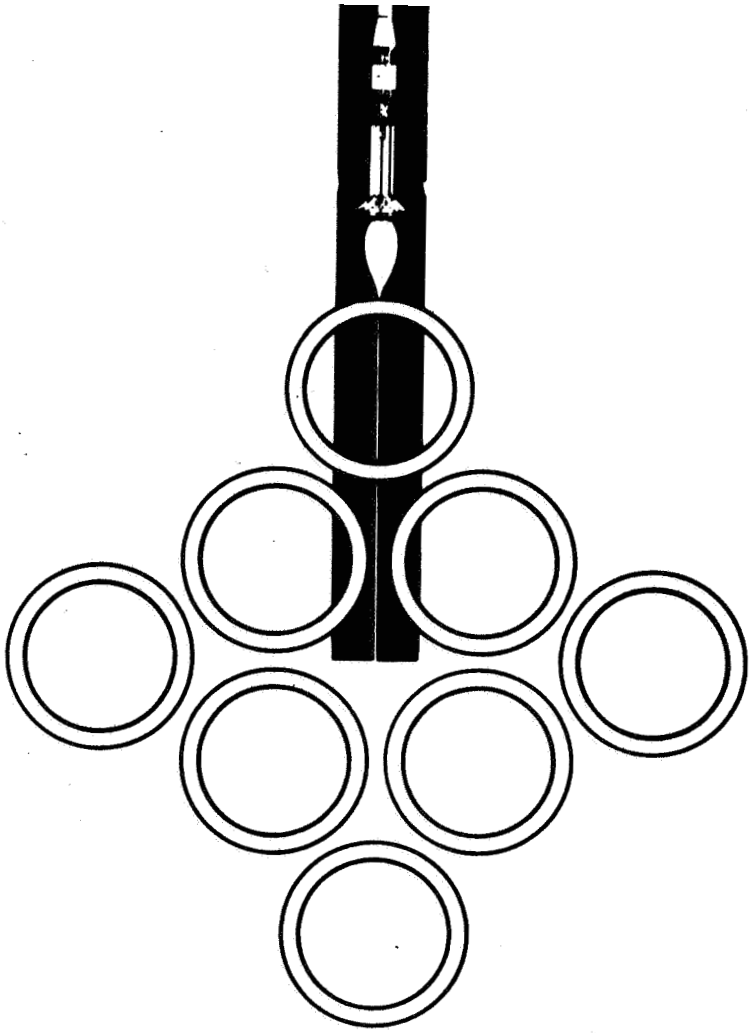

ENGINEERING DEPARTMENT

TECHNICAL REPORT

TR-RE-CCSD-FO-1039-3

August 1, 1966

SATURN IB PROGRAM

TEST REPORT
FOR

PRESSURE REGULATOR

Marotta Valve Corporation Part Number 230844-2

Model Number RV74EB

NASA Drawing Number 75M06302

SPACE DIVISION CHRYSLER CORPORATION

TEST REPORT

FOR

PRESSURE REGULATOR

Harotta Valve Corporation Part Number 230844-2

Model Number RV74EB

NASA Drawing Number 75M06302

ABSTRACT

This report presents the results of tests performed on three samples of pressure regulator 75M06302. The following tests were performed.

1.	Receiving Inspection	8.	Surge
2.	Proof Pressure	9.	Vibration
3.	Functional	10.	Sand and Dust
4.	Flow	11.	Salt Fog
5.	Pressure Regulator	12.	Life Cycle
6.	Low Temperature	13.	Final Inspection
7.	High Temperature	14.	Burst

The performance of the specimens was in accordance with the specification requirements of NASA Drawing 75M06302 except the low temperature test. Specimens 1 and 3 showed an increase in outlet pressures when subjected to the rated low temperature.

TR-RE-CCSD-FO-1039-3

TEST REPORT

FOR

PRESSURE REGULATOR

Marotta Valve Corporation Part Number 230844-2

Model Number RV74EB

NASA Drawing Number 75M06302

August 1, 1966

CHRYSLER CORPORATION SPACE DIVISION - NEW ORLEANS, LOUISIANA

FOREWORD

The tests reported herein were conducted for the John F. Kennedy Space Center by Chrysler Corporation Space Division (CCSD), New Orleans, Louisiana. This document was prepared by CCSD under contract NAS8-4016, Part VII, CWO 271620.

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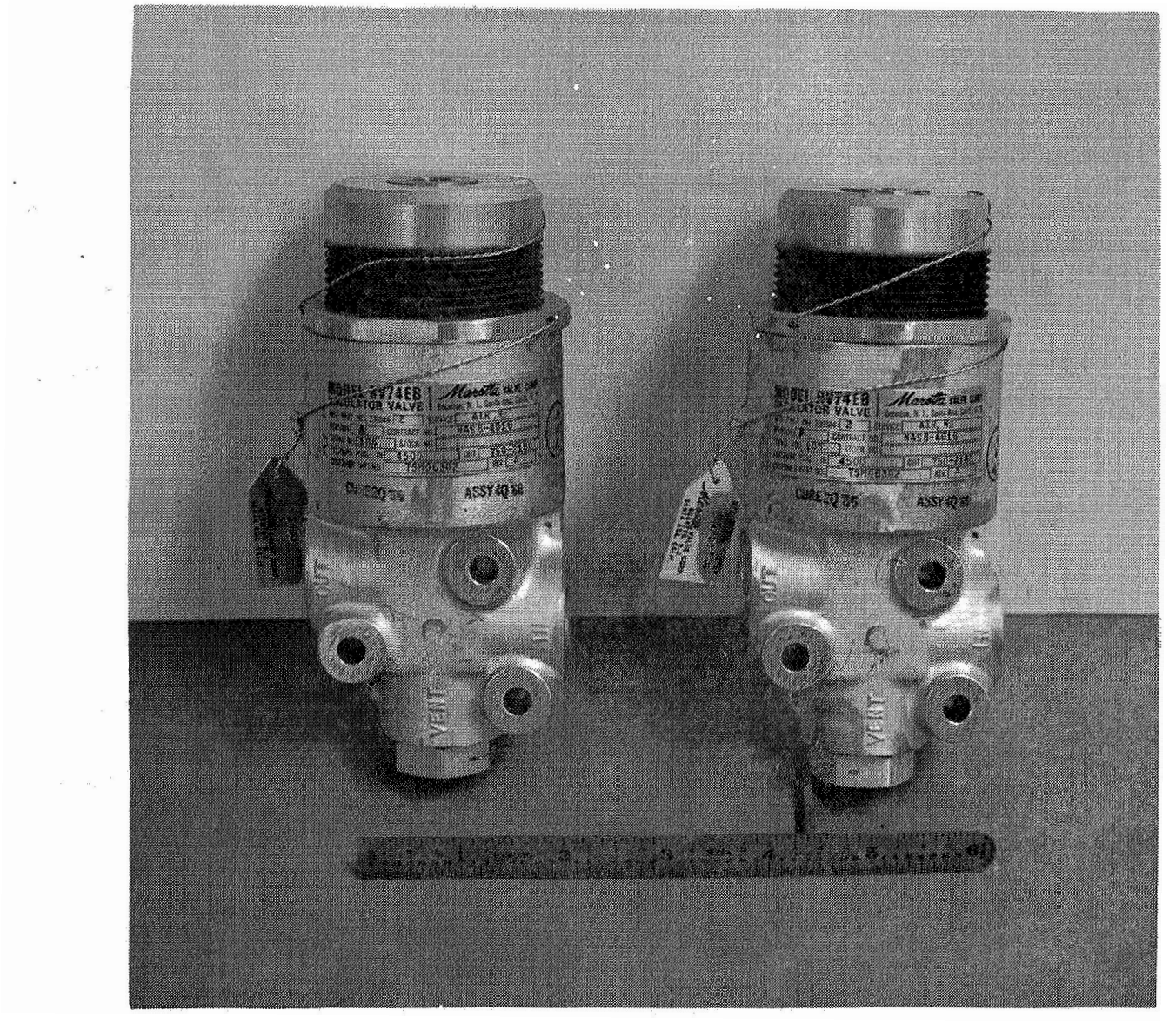


Pressure Regulator, 75M06302, Test Specimens 1 and 3

CHECK SHEET

FOR

PRESSURE REGULATOR

MANUFACTURER: Marotta Valve Corporation.
MANUFACTURER'S PART NUMBER: 230844-2
MANUFACTURERS MODEL NUMBER: RV74EB
NASA DRAWING NUMBER: 75M06302
TFSTING AGENCY: Chrysler Corporation Space Division, New Orleans, Louisiana
AUTHORIZING AGENCY: NASA KSC

I. FUNCTIONAL REQUIREMENTS

A.	OPERATING PRESSURE	Inlet Pressure - 4500 psig Outlet Pressure - 750 to 2160 psig
B.	PROOF PRESSURE:	6750 psig
C.	BURST PRESSURE:	11,250 PSIG
D.	OPERATING MEDIUM:	Dry Air or Nitrogen
E.	LEAKAGE:	Bubble Tight
F.	FLOW:	Monodirectional, 1 scfm minimum, reverse relief

II. CONSTRUCTION

A.	MATERIAL:	Body-6061T6 AL, anodized per SP125; Xetal parts in flaw stream are 303 stainless steel, 2024-T4 aluminum alloy, and 6061-T6 aluminum alloy. Nonmetallic parts in flaw stream are nylon and synthetic rubber.
B.	PNEUMATIC CONNECTIONS:	Inlet: MC240-6 Outlet: MC240-8

III. ENVIRONMENTAL REQUIREMENTS

A.	OPERATING TEMPERATURE:	0°F to +160°F

IV. SPECIAL REQUIREMENTS

A.	CLEANING SPECIFICATION:	A10M01671, Level IV

V. LOCATION AND USE: Used to control supply pressure in the Apollo Access Arm.

x

TEST SUMMARY

PRESSURE REGULATOR

Environment	Units	Operational Boundary	Test Objective	Test Results			Rmearks
				1	2	3	
Receiving Inspection	1, 2, 3	Drawings and Specifications	Check for poor workmanship and manufacturing defects	S	U	S	Specimen 2 had pitted threads and evidence of stress corrosion at the mating of dissimilar metals. However, it was deemed satisfactory for test. This specimen had been in storage at KSC.
Proof Pressure	1, 2, 3	6750 psig for 5 minutes	To verify capability to withstand high pressure and to check for leakage.	S	S	S	Zero leakage, no deformity
Functional	1, 2, 3	1500 psig outlet, 3000 psig inlet	Determine whether specimen meets functional requirements and operation without leakage at ambient condition	S	S	S	Zero leakage
Flow Test	1, 3	1000, 2000, 3000, 4000, 4500, psig inlet pressure with 750, 1000, 1250, 1500, 1750 and 2160 psig outlet pressure	Develope flow curves for inlet pressures of 1000, 2000, 3000, 4000, 4500 psig with set outlet pressures of 750, 1000, 1250, 1500, 1750, 2160, psig	=	X	=	
Pressure Regulation and Relief Test	1, =	Inlet pressure 1000-4500 psig outlet pressure 750, 1000, 1250, 1500, 1750, and 2160	Determine outlet pressure regulation and vent port relief operation	S	X	S	

TEST SUMMARY (CONTINUED)

PRESSURE REGULATOR

Environment	Units	Operational Boundary	Test Objective	Test Results			Rmearks
				1	2	3	
Low Temperature	1, 3	0°F (+0, ω°F]	To determine if specimen operation is impaired by low temperature.	M	X	M	Outlet pressure shifted at low temperatures.
High Temperature	1	160°F (+4, -0°F)	To determine if specimen operation is impaired by high temperature.	S	X	X	
Surge	1, 3	0 to 4500 psig within 100 milli-seconds specimen set for 750 psig outlet. 100 cycles	To determine if specimen operation is impaired by surging	S	X	S	
Vibfation	1, 2	Resonant frequency search levels - 5 to 65 cps 0.01 DA inch, 65 to 3000 cps, 2g, sinusoi-dal sweep levels - 10 to 65 cps, 1.0 DA inch, 65 to 2000 cps 20g, random excitation levels - 10 to 100 cps, 6 dt/octave 100 to 1000, $0.05g^2$/ cps, 1000 to 2000, -6 db/octave	To determine if the dynamic environment causes deformation or distortion	S	S	X	

TEST [redacted] (CONTINUED)

PRESSURE REGULATOR

Environment	Units	Operational Boundary	Test Objective	Test Results			Rmearks
				1	2	3	
Sand and Dust	3	Sand density: 0.1 to 0.5 gm/ft^3 air velocity: 100 to 500 fpm Temperature: 77°F for 2 hour period	Determine whether the sand and dust test causes degradation or impairment of specimen operation	S	X	X	
Salt Fog	1	5% Salt solution, 240 hour period at 95°F (+4, -2°F)	Determine whether prolonged exposure to salt fog causes deformation or degradation to the test specimen	X	X	S	There was evidence of corrosion on the body of the specimen, no leakage or distortion during functional.
Life Cycle	1, 2, 3	5000 cycles, inlet 0 to 3000 to 0 psig with outlet set at 1500 psig	Determine whether specimen operation is impaired by the life cycle test	S	S	S	
Final Inspection	1, 2, 3		Check for damage or distortion resulting from testing	S	S	S	
Burst	1, 2	11,250 psig hydrostatic pressure for 5 minutes	Determine whether minimum burst pressure causes structural damage or leakage to the test specimen	S	S	X	

Legend: S - Satisfactory operation
U - Unsatisfactory operation
M - Marginal operation
X - Not tested

SECTION I

INTRODUCTION

1.1 SCOPE

This report presents the results of tests that were performed to determine if pressure regulator 75M06302 meets the operational and environmental requirements for the John F. Kennedy Space Center Launch Complexes 34 and 37. A summary of the results is presented in pages ix through xiii.

1.2 ITEM DESCRIPTION

1.2.1 Three specimens of the pressure regulator 75M06302 were tested. The regulator is a hand-loaded pneumatic device used with dry air or gaseous nitrogen.

1.2.2 The regulator is designed to reduce an inlet pressure of 4500 psig to an outlet pressure ranging from 750 to 2160 psig. It is manufactured by Marotta Valve Corporation as their model number RV74EB and is used to control supply pressure in the Apollo Access Arm.

1.3 APPLICABLE DOCUMENTS

1.3.1 The following [illegible] in the [illegible] requirements for pressure [illegible] 75M06302:

[illegible]530: Rev A, component specification

b. KSC-STD-164(D), Standard Environmental Test Methods for Ground Support Equipment Installations at Cape Kennedy

c. A10M01671, cleanliness requirement

d. Test Plan CGSD-FO-1039-1R, test requirements

SECTION II

RECEIVING INSPECTION

2.1 TEST REQUIREMENTS

2.1.1 The test specimens shall be checked for conformance with NASA drawing 75M06302, Rev A, vendor drawings 230844 and 330843 and applicable specifications to the extent possible without disassembly of the test specimens. The specimens shall also be inspected for poor workmanship and manufacturing defects.

2.2 TEST PROCEDURE

2.2.1 The test specimens were checked for conformance with NASA drawing 75M06302 Rev A and vendor drawings 230844 and 330843 using the equipment listed in table 2-1.

2.2.2 The test specimens were checked for defective threads and welds and for poor workmanship and manufacturing defects,

2.3 TEST RESULTS

2.3.1 Test specimens 1 and 3 complied with NASA drawing 75M06302 Rev A and vendor drawings 230844 and 330843. No evidence of poor workmanship or manufacturing defects was observed.

2.3.2 Test specimen 2 complied Kith NASA drawing 75M06302 Rev A and vendor drawings 230844 and 330843; however, the threads in the inlet and outlet ports of the test specimen showed evidence of pits. On the relief end of the test specimen 2, where the aluminum case met the stainless steel port, stress corrosion crack8 had formed as shown in figure 2-1. These conditions were reviewed by metallurgists and the specimen was deemed satisfactory for test. This particular sample was not received directly franthe vendor, but came fran KSC where it had been in storage as a spare.

2.4 TEST DATA

The data presented in table 2-2 were reported during the inspection.

Table 2-1. Receiving Inspection Test Equipment List

Item NO.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Marotta	RV74EB	106(specimen 1) 101(specimen 2) 105(specimen 3)	Pressure regulator
2	Micrometer	Lufkin	NA	NASA 40-1135C	1.00- 2.00 in. Cal. date 12/8/66
3	Micrometer	Starett	436	NASA 36-1016	2.000- 3.000 in Cal. date 12/21/66

Table 2-2. Receiving Inspection Test Data

Specimen S/N	Dimensions - Inches					
	Length		Width		Diameter	
	Specified	Actual	Specified	Actual	Specified	Actual
106	4.490 (max)	4.440	1.370 to 1.380	1.377	2.530 to 2.550	2.550
101	4.490 (max)	4.440	1.370 to 1.380	1.377	2.530 to 2.550	2.550
105	4.490 (max)	4.450	1.370 to 1.380	1.377	2.530 to 2.550	2.550

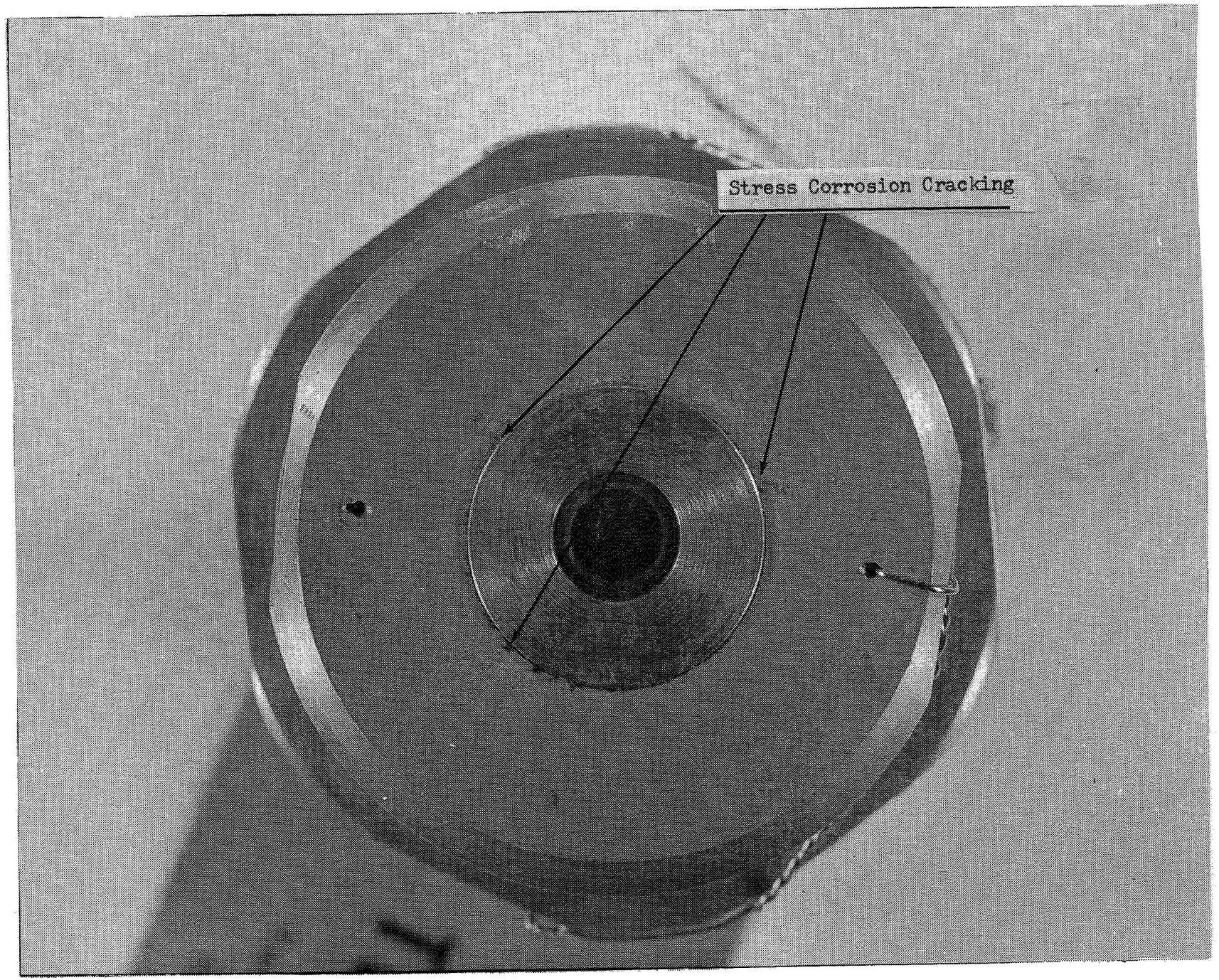


Figure 2-1. Receiving Inspection, Test Specimen 2, S/N 101

SECTION III

PROOF PRESSURE TEST

3.1 TEST REQUIREMENTS

Each test Specimen shall be pressurized with dry air or nitrogen to a proof pressure of 6750 psig. This pressure shall be maintained for 5 minutes and the regulators shall be chedked for leakage and distortion.

3.2 TEST PROCEDURE

3.2.1 The test specimen was installed as shown in figure 3-1 utilizing the equipment listed in table 3-1.

3.2.2 Regulator 5 was adjusted for zero outlet pressure. Hand valve 3 was closed. The outlet port of the test specimen was capped. No adjustment was made to the outlet pressure of the test specimen.

3.2.3 Hand valve 9 was slowly opened. Gage 4 read *8000* psig.

3.2.4 Regulator 5 was adjusted to provide an outlet pressure of 6750 psig as indicated on gage 7. This pressurised the inlet port of the test specimen.

3.2.5 The proof pressure of 6750 psig was maintained for 5 minutes. Leakage from the vent port was monitored by checking for bubbles in the water tank. Leakage at all connections and at the specimen case were monitored.

3.2.6 Hand valve 9 was closed and hand valve 3 was slowly opened to vent the system.

3.2.7 The test specimen was examined for damage or distortion. All data were recorded.

3.3 TEST RESULTS

3.3.1 The outlet pressure adjustments for all three test specimens remained in the "as received" preset condition during the proof pressure test.

3.3.2 The test specimens did not leak, and there was no evidence of damage or distortion.

3.4 TEST DATA

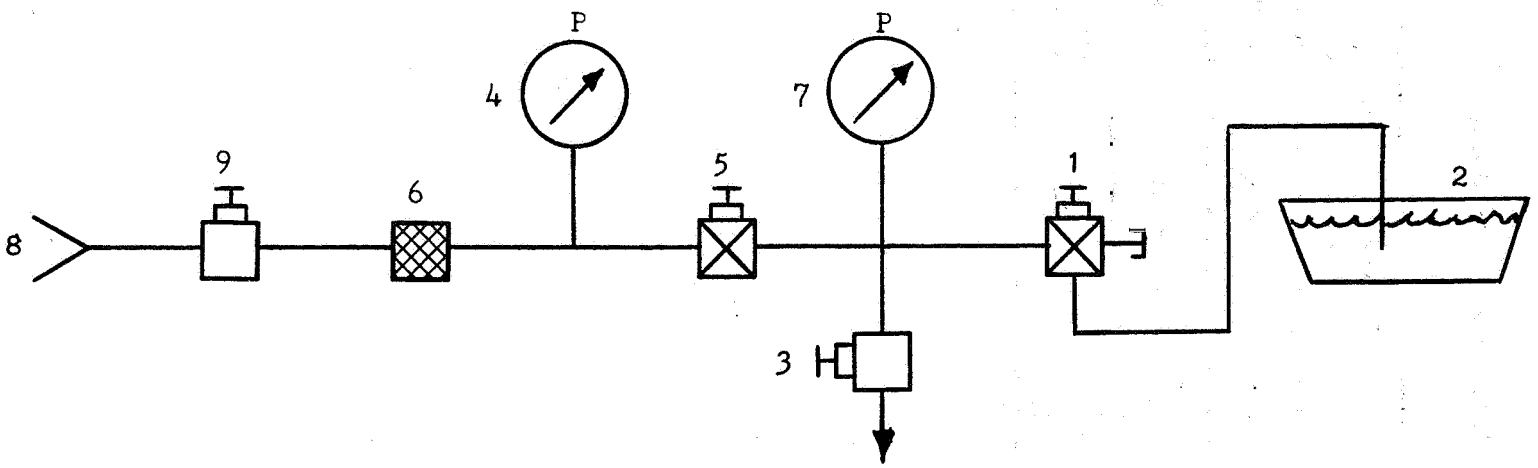
The data presented in table 3-2 were recorded during the test.

Table 3–1. Proof Pressure Test Equipment List

tern No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Marotta Valve Corporation	230844-2	106 101 105	Pressure Regulator
2	Water Tank	CCSD	NA	NA	Deionized water
3	Hand Valve	Aminco	44-13126	NA	1/4-inch
4	Pressure Gage	Ashcroft	NA	NASA-95 1508-B	0-to 20,000 psig ±% FS accuracy Cal. date 10/11/66
5	Regulator	Tescom Corporation	26-1021-20	3024	10,000-psig inlet 0-to 10,000-psig outlet
6	Filter	Microporous Filter Co.	4813F-2M	NA	2-micron
7	Pressure Gage	Heise	NA	NASA-014231	0-to 10,000-psig ±1% FS accuracy Cal. date 10/12/66
8	GN_2 Source	CCSD	NA	NA	3000-psig
9	Hand Valve	Combination Pump and Valve Co,	380-4	NA	1-½-inch

Table 3-2. Proof Pressure Test Data

Test Specimen	Proof Pressure (psig)	Pressurization Time	Remarks
1	6750	5 min.	No leakage
2	6750	5 min.	No leakage
3	6750	5 min.	No leakage



Note: All lines $\frac{1}{4}$ inch.
Refer to table 3-1 for item identification.

Figure 3-1. Proof Pressure Test Schematic

SECTION IV

FUNCTIONAL TEST

4.1 TEST REQUIREMENTS

4.1.1 Each test specimen shall be checked for stability of operation and for leakage with the inlet port pressurized to 3000 psig and the outlet pressure set at 1500 psig.

4.1.2 The procedure in 4.1.1 shall be repeated five times for each. functional test.

4.2 TEST PROCEDURE

4.2.1 The test setup was assembled as shown in figures 4-land 4-2 utilizing the equipment listed in table 4-1.

4.2.2 All hand valves were closed and regulator 6 was adjusted for zero outlet pressure.

4.2.3 Hand valve 3 was opened and the supply pressure was read on gage 5.

4.2.4 Regulator 6 was adjuated to provide an inlet pressure of 3000 psig to the test specimen. This pressure was read on gage 7.

4.2.5 The initial functional test was performed with the test specimens adjusted to the "as received " preset outlet pressure. Thereafter the test specimen was adjusted to provide an outlet pressure of 1500 psig as read on gage 9.

4.2.6 The condition described in 4.2.4 and 4.2.5 were maintained for 5 minutes while continuously checking for fluctuations in specimen outlet pressure and for external or vent port leakage. Vent port leakage was monitored by checking for bubbles in the water tank.

4.2.7 Regulator 6 was adjusted for zero outlet pressure. Hand valves 8 and 10 were opened to vent the teat specimens.

4.2.8 The procedures described in 4.2.2 through 4.2.7 were repeated five times during the initial functional test and all subsequent functional tests.

4.3 TEST RESULTS

4.3.1 Outlet pressures were observed to drop during the 5 minute test period for all three specimens. This variation in outlet pressure was attributed to temperature stabilization of the test media following specimen pressurization.

4.3.2 No leakage through the vent port was observed. No external leakage was observed.

4.4 TEST DATA

The data presented in tables 4-1, 4-2 and 4-3 were recorded during the initial functional testa.

Table 4-1. Functional Test Equipment Liat

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Teat Specimen	Marotta Valve Corporation	230844-2	106 101 105	
2	GN_2 Supply	CCSD	NA	NA	3500-psig
3	Hand Valve	Consolidated Pump and Valve	D52	NA	1-1/2-inch
4	Filter	Microporous	4S13F-20M	NA	2-micron ab8olute 6000 psig
5	Pressure Gage	Ashcroft	NA	NASA 200595-K	0-to 3500-psig ½% FS accuracy Cal. date 7/24/66
6	Pressure Regulator	Tescom	1002	26-1003	3500-psig inlet 0-to 3000-psig outlet
7	Pressure Gage	Ashcroft	NA	NASA 200595-1	0-to 3500-psig ±1% FS accuracy Cal, date 7/24/66
8	Hand Valve	Robbins	NA	SSKG-250-4T	1/4-inch
9	Pressure Gage	Heise	NA	NASA-200595-Q	0-to 3000-psig 1% accuracy Cal. date 7/24/66
10	Hand Valve	Anderson Greenwook	H1VP-8T	NA	
11	Thermocouple	Honeywell	NA	NA	-50°F to +200°F ±2.5°F accuracy (for temperature tests only)
12	Temperature Chamber	Conrad	NA	NASA 200491	-5°F to 165°F (For temperature teats only
13	Water Tank	CCSD	NA	NA	

Table'&-2, Initial Functional Test Data

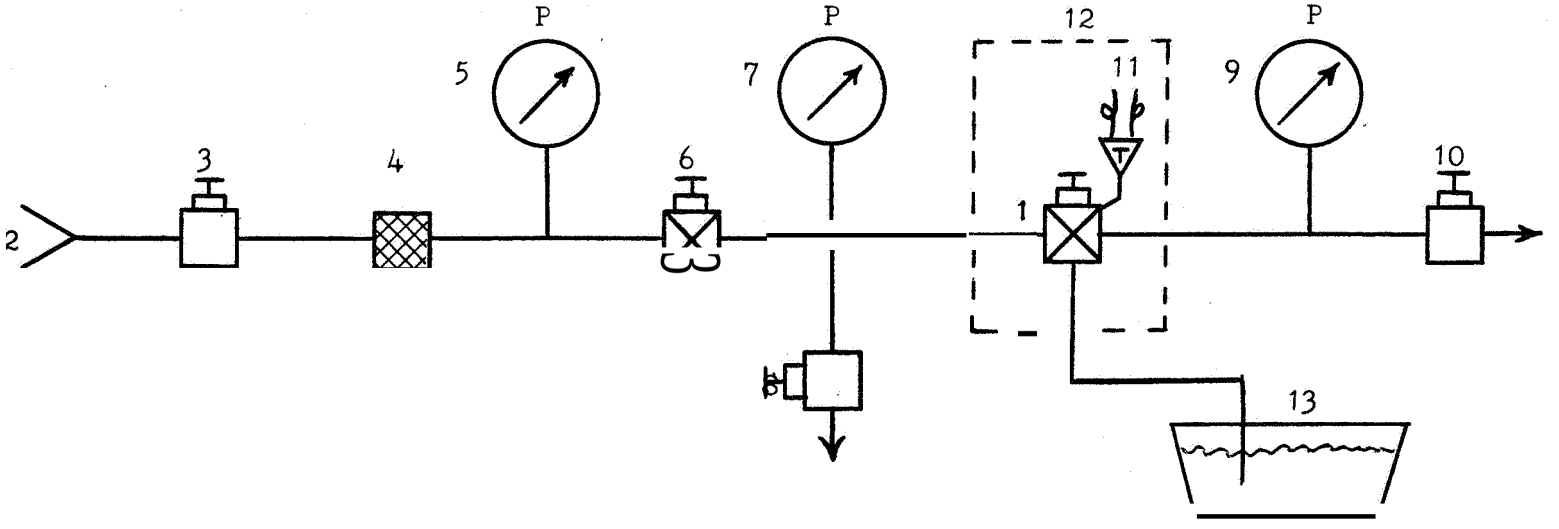
Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 minutes (psig)
1	3000	1500	1483
2	3000	1490	1480
3	3000	1490	1480
4	3000	1490	1480
5	3000	1490	1480

Table 4-3. Initial Functional Test Data

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	wfter 5 minutes (psig)
1	3000	490	1480
2	3000	1495	1485
3	3000	3495	485
4	3000	1495	1485
5	3000	1500	1485

Table 4-4. Initial Functional Test Data

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 minutes (psig)
1	3000	1500	1490
2	3000	1495	1485
3	3000	1495	1480
4	3000	1495	1480
5	3000	1490	1480



Note: All lines $\frac{1}{4}$ inch.
Refer to table 4-1 for item identification.

Figure . unctional Test Schematic

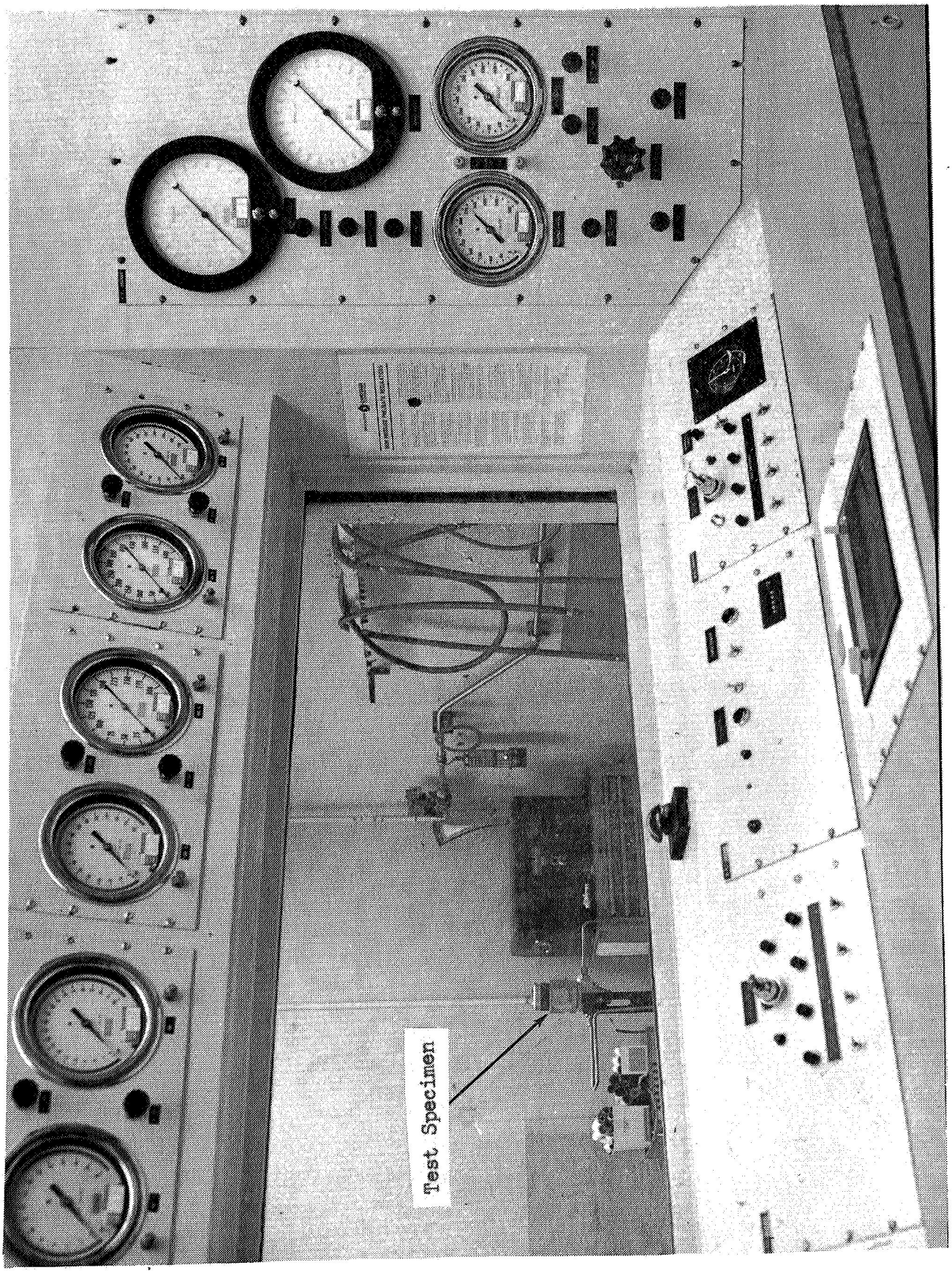


Figure 4-2. Functional Test Setup

SECTION V

FLOW TEST

5.1 TEST REQUIREMENTS

5.1.1 Test specimens land 3 shall be subjected to a flow test to determine flow characteristics.

5.1.2 Flow curves shall be developed for inlet pressures of 1000, 2000, 3000, 4000, and 4500 psig with outlet pressures of 750, 1000, 1250, 1500, 1750, and 2160 psig for each inlet pressure; however, curves will not be developed when the outlet pressure exceeds the inlet pressure,

5.2 TEST PROCEDURE

5.2.1 The specimen was installed as shown in figures 5-1 and 5-2 utilizing the equipment listed in table 5-1.

5.2.2 All hand valves were closed and the regulator was adjusted to provide zero outlet pressure.

5.2.3 Hand valve 3 was opened and the supply pressure was read on gage 5.

5.2.4 Regulator 6 was adjusted to provide a specimen inlet pressure of 1000 pig as read on gage 7.

5.2.5 The specimen was adjusted to provide a static outlet pressure of 750 psig as read on gage 10.

5.2.6 Hand valve 12 was slowly opened until the test specimen vent port showed signs of leakage.

5.2.7 Regulator 6 was adjusted as required to maintain the specimen inlet pressure of 1000 psig as read on gage 7.

5.2.8 As hand valve 12 was opened, readings were recorded fran gages 7, 10 and 11. At each of these pressure readings the temperature from thermocouple 8 was recorded.

5.2.9 Procedures described in 5.2.4 through 5.2.8 were repeated for each combination of specimen inlet and outlet pressure specified in 5.1.2.

5 02.10 Curves were developed showing flow versus outlet pressure for each inlet pressure.

5.3 TEST RESULTS

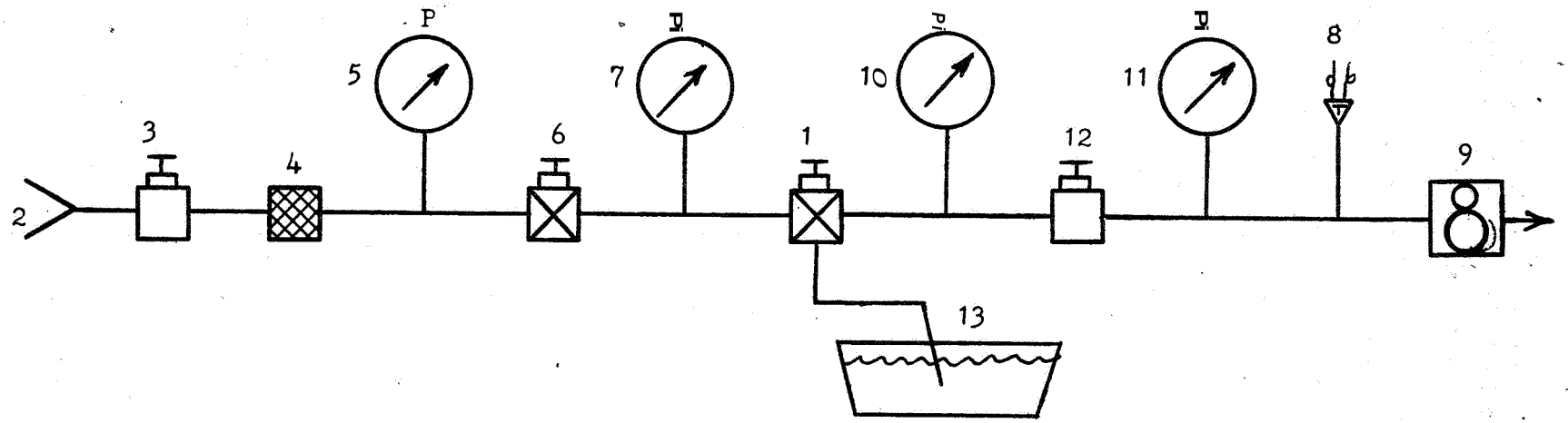
5.3.1 Data was recorded up to the point where increased flow caused the vent port to open. Both specimens performed satisfactorily.

5.4 TEST DATA

5.4.1 Outlet pressure versus flow for each inlet pressure is presented graphically in figures 5-3 through 5-12.

Table 5-1. Flaw Test Equipment List

Item No.	item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Marotta Valve Corporation	230844-2		Pressure Regulator
2	GN_2 Supply	CCSD	NA	NA	6000-psig
3	Hand Valve	Dragon	AN-4	NA	1-1/2-inch 10,000 psig
4	Filter	Bendix Aviation Corporation	M/N5-6-13461-16 -B-0	S/N 21	2-micron
5	Pressure Gage	Ashcroft	NA	NASA 200613-3	0-to 20,000-psig ±5% FS accuracy Cal. date 10/12/66
6	Regulator	Tescom Crop.	M/N 26-1021-10	S/N 1529	10,000-psig inlet 0-to 10,000-psig outlet
7	Pressure Gage	Heise	MA	NASA 200613-5	9-to 5000-psig 0.10% FS accuracy Cal. date 10/12/66
8	Thermocouple	Honeywell	NA	NA	-50°F to +200°F ±2.5°F accuracy
9	Flowmeter	Flowdyne	P/N XN 320313-5GP	S/N 2322	0-to 2000-SCFM (Calibrated nozzle)
10	Pressure Gage	Heise	NA	NASA 200613-6	0-to 3000-psig 0.10% FS accuracy Cal. date 10/12/66
11	Pressure Gage	Heise	NA	NASA 200613-11	0-to 3000-psig 0.10% FS accuracy Cal. date 10/12/66
12	Hand Valve	Anderson Greenwood	H1VP-8T	NA	1/2-inch ball valve
13	Water Tank	CCSD	NA	NA	



Note: All lines $\frac{1}{2}$ inch.
Refer to table 5-1 for item identification.

Figure 5-1. Flow Test Schematic

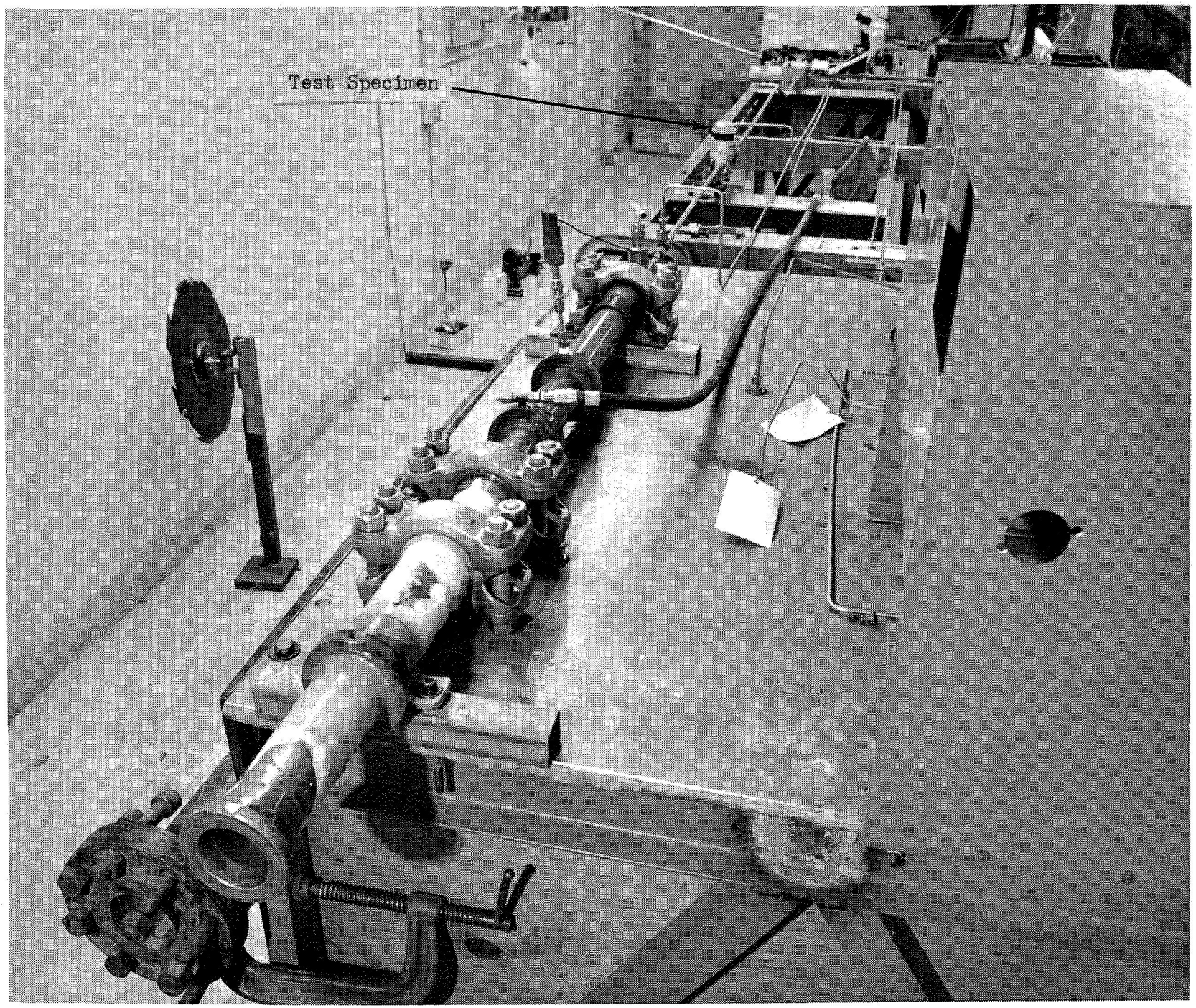


Figure 5-2. Flow Test Setup

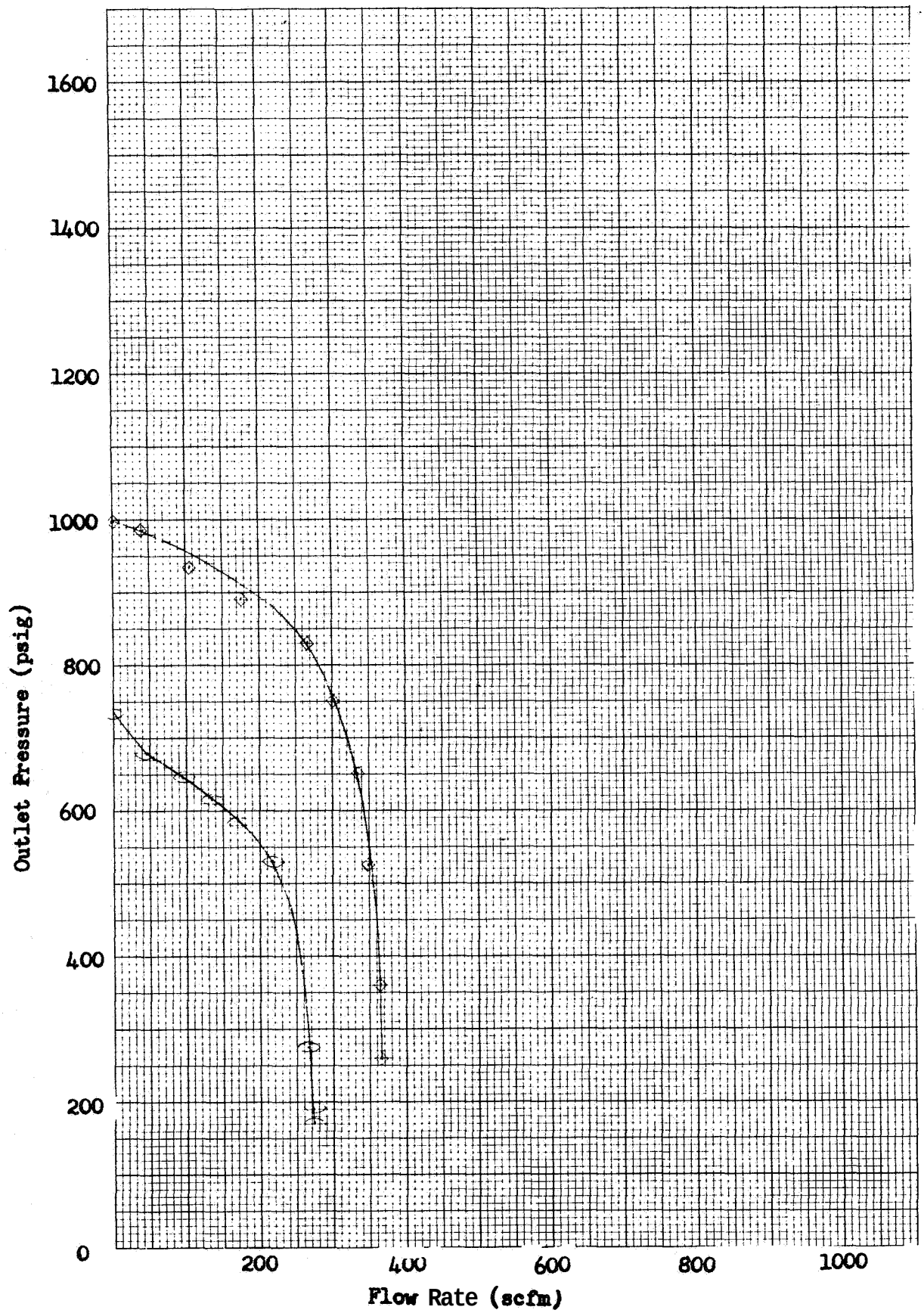


Figure 5-3. Outlet Pressure vs. Flow Rate, Inlet 1000 psig Test Specimen 1

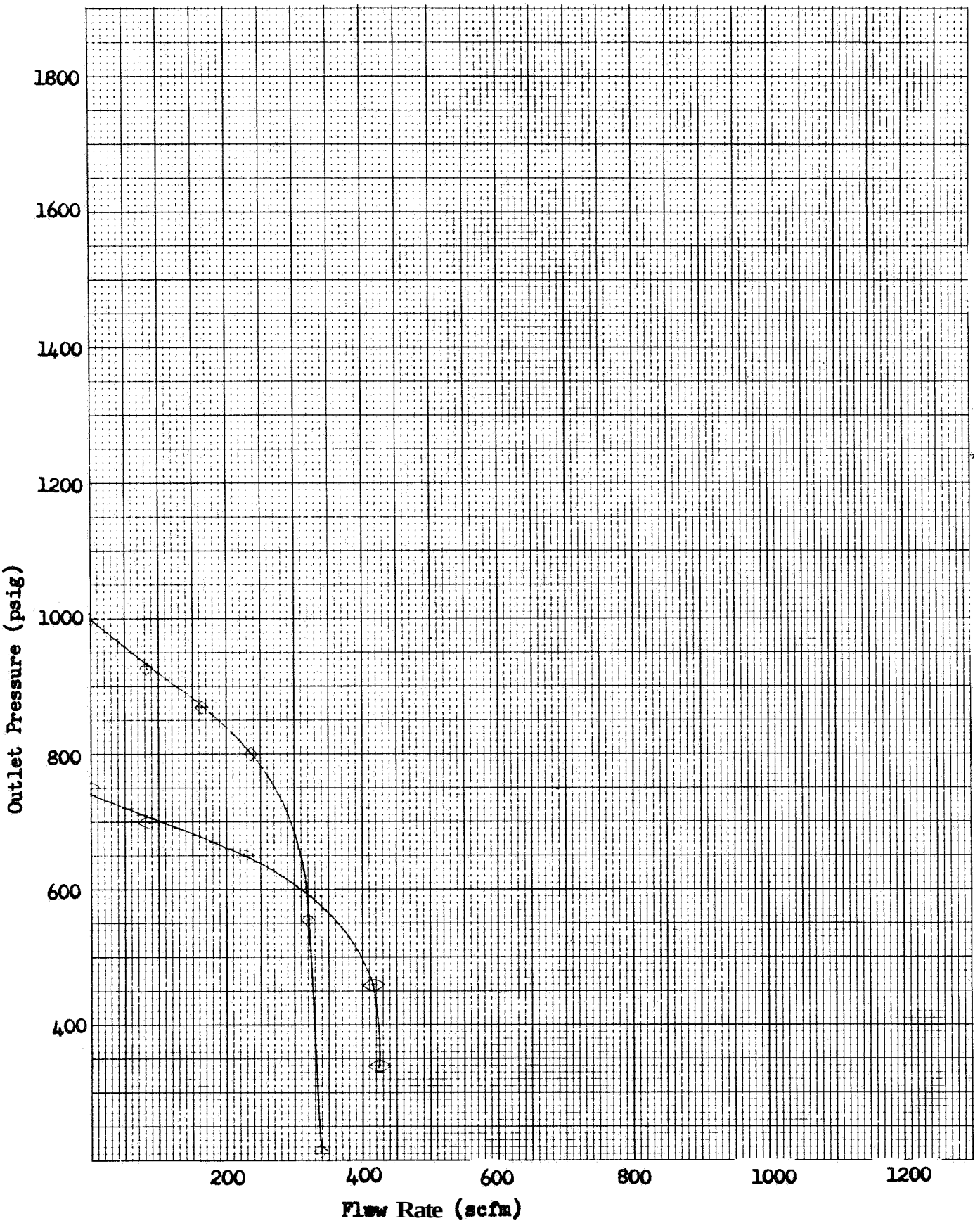


Figure 5-4. Outlet Pressure vs. Flow Rate, Inlet 1000 psig, Test Specimen 3

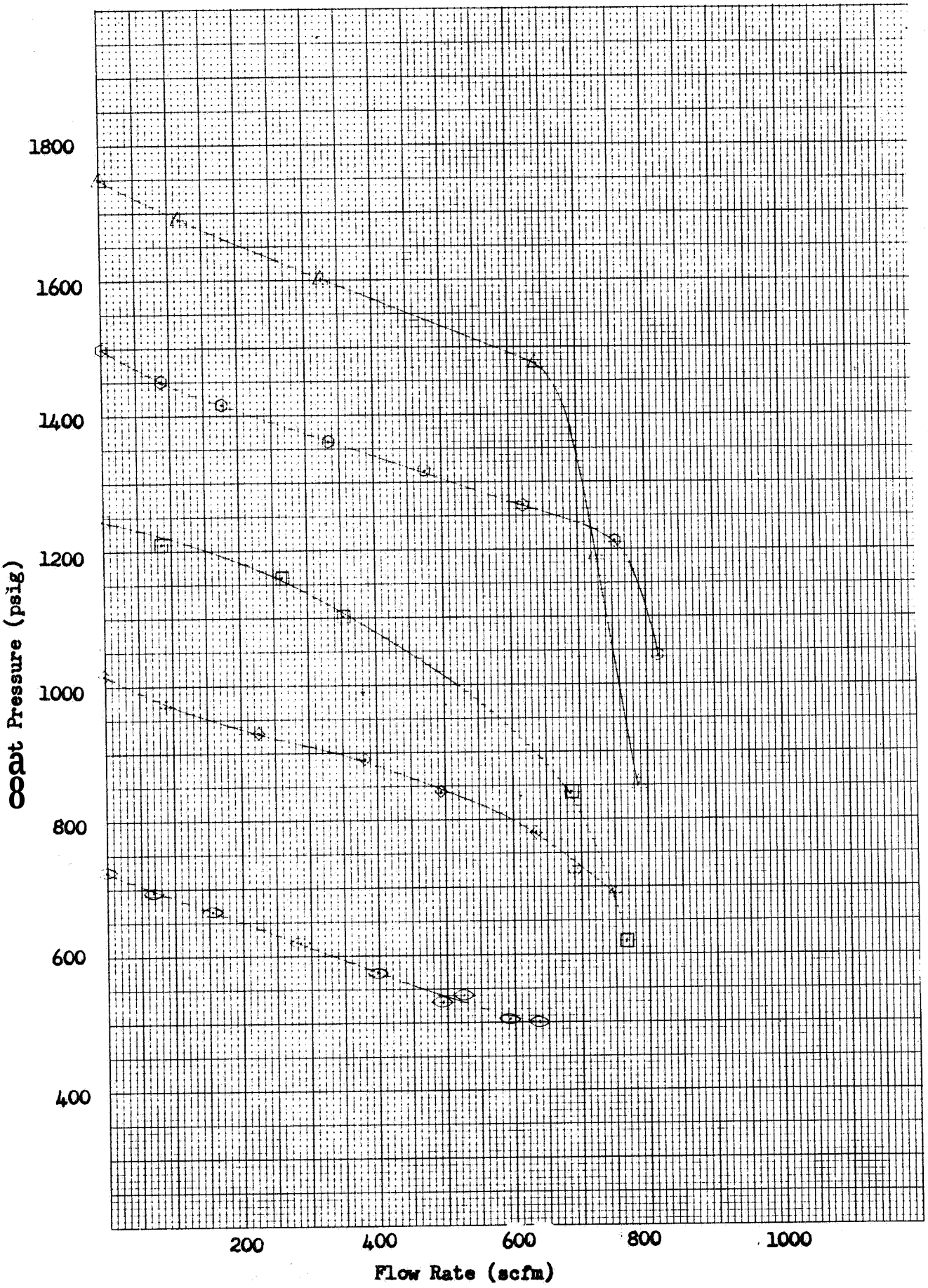


Figure 5-5. Outlet Pressure vs. Flow Rate, Inlet 2000 psig, Test Specimen 1

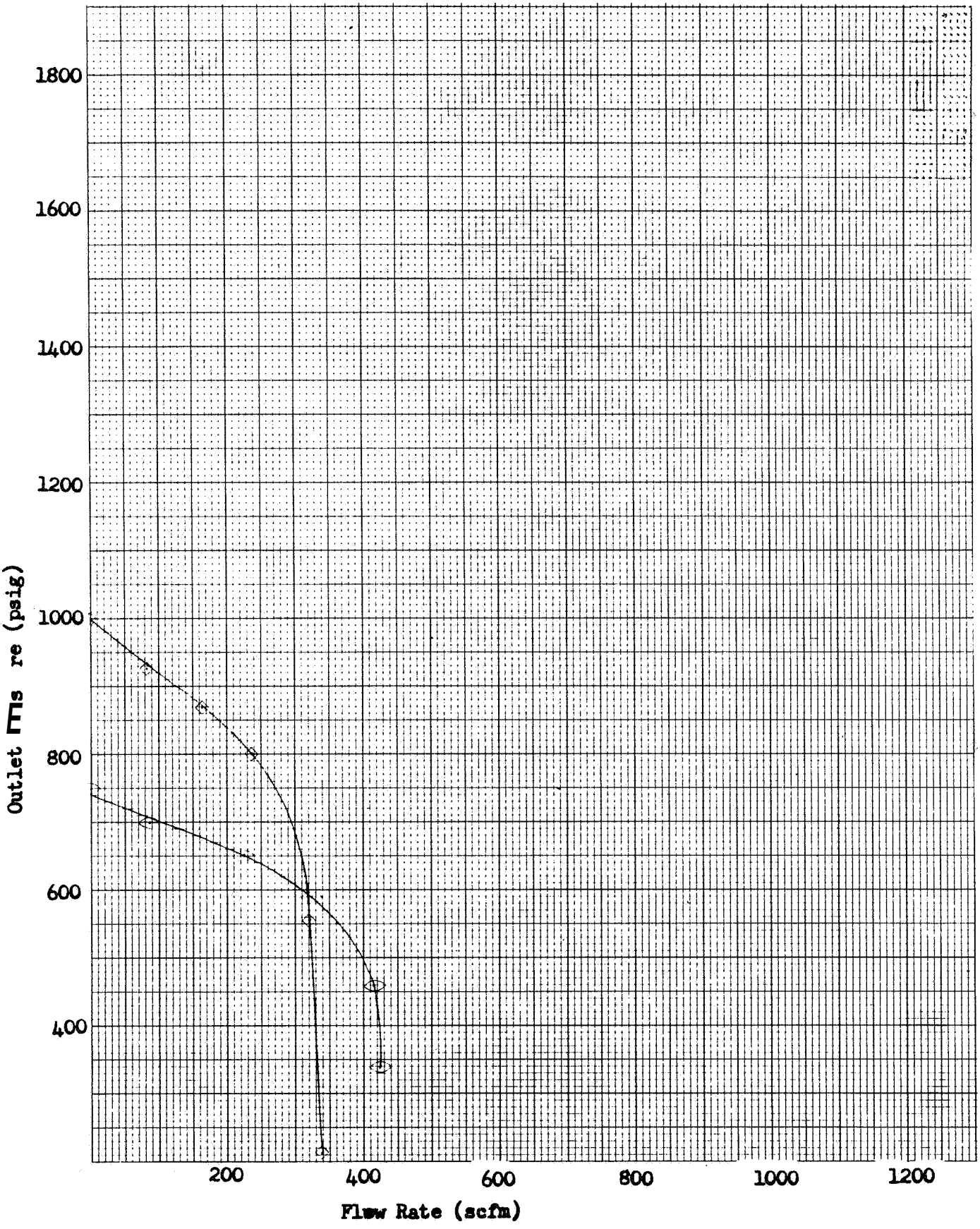


Figure 5-4. Outlet Pressure vs. Flow Rate, Inlet 1000 psig, Test Specimen 3

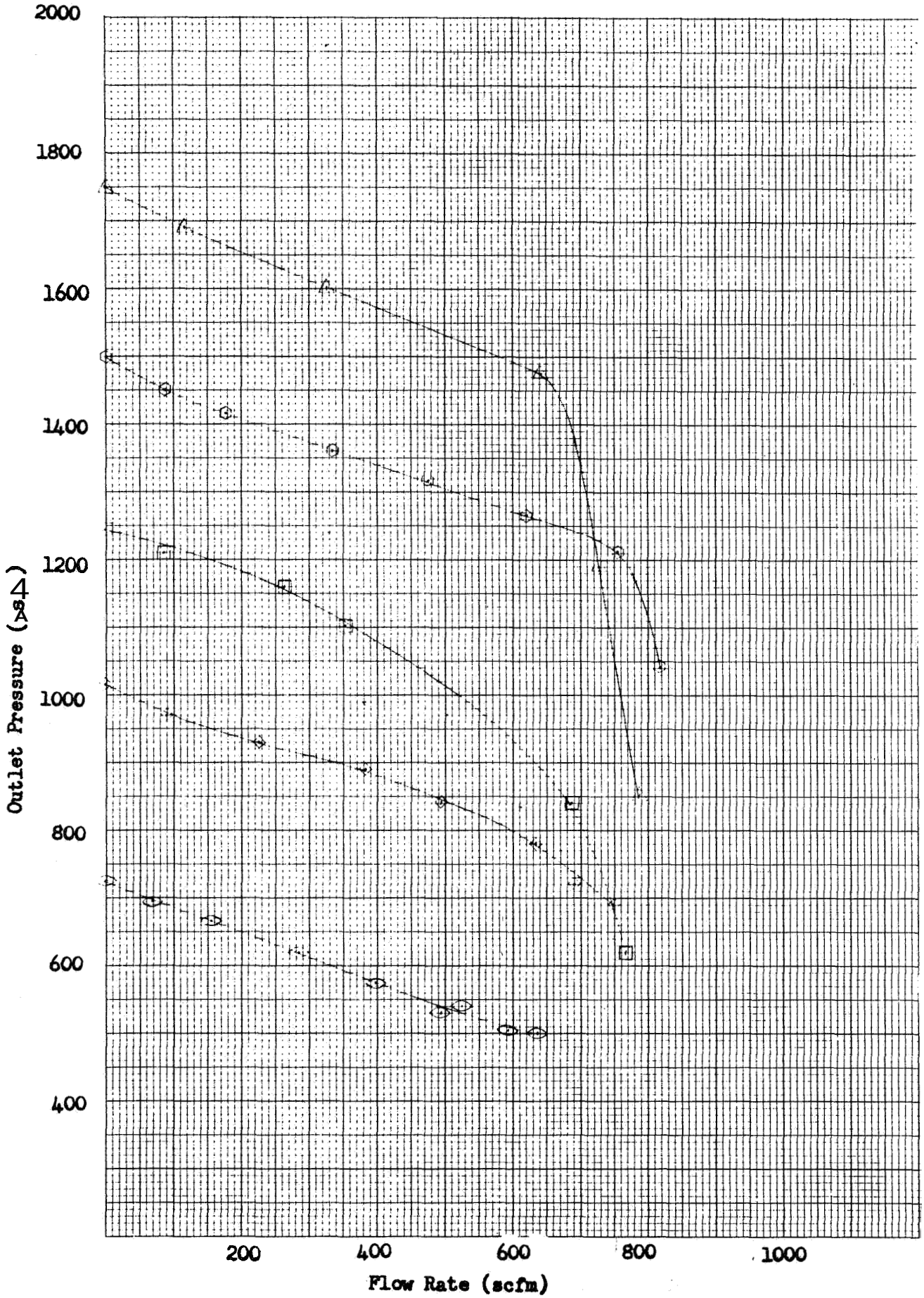


Figure 5-5. Outlet Pressure vs. *Flaw* Rate, Inlet 2000 psig, Test Specimen 1

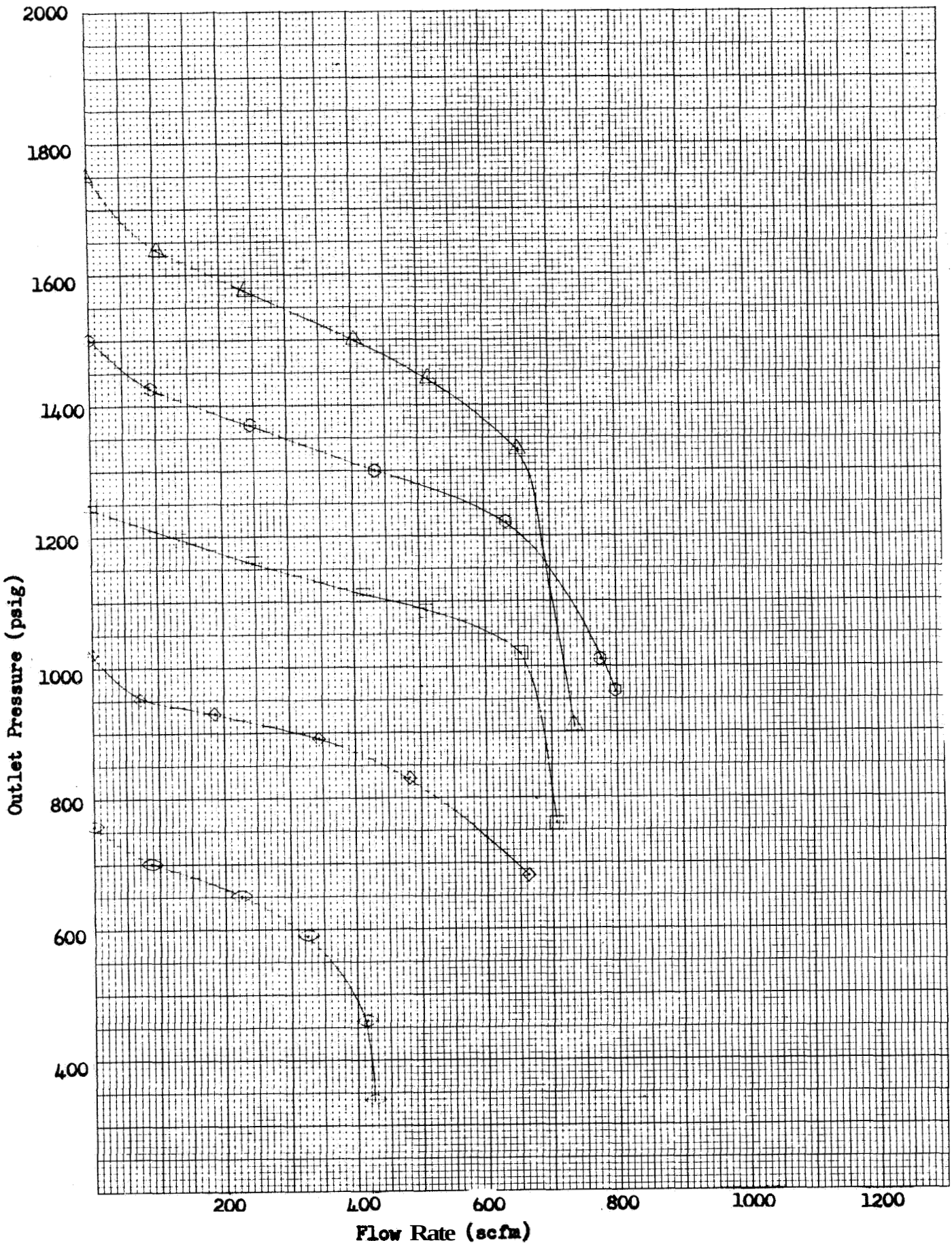


Figure 5-6. Outlet Pressure vs. Flow, Inlet 2000 psig Test Specimen 3

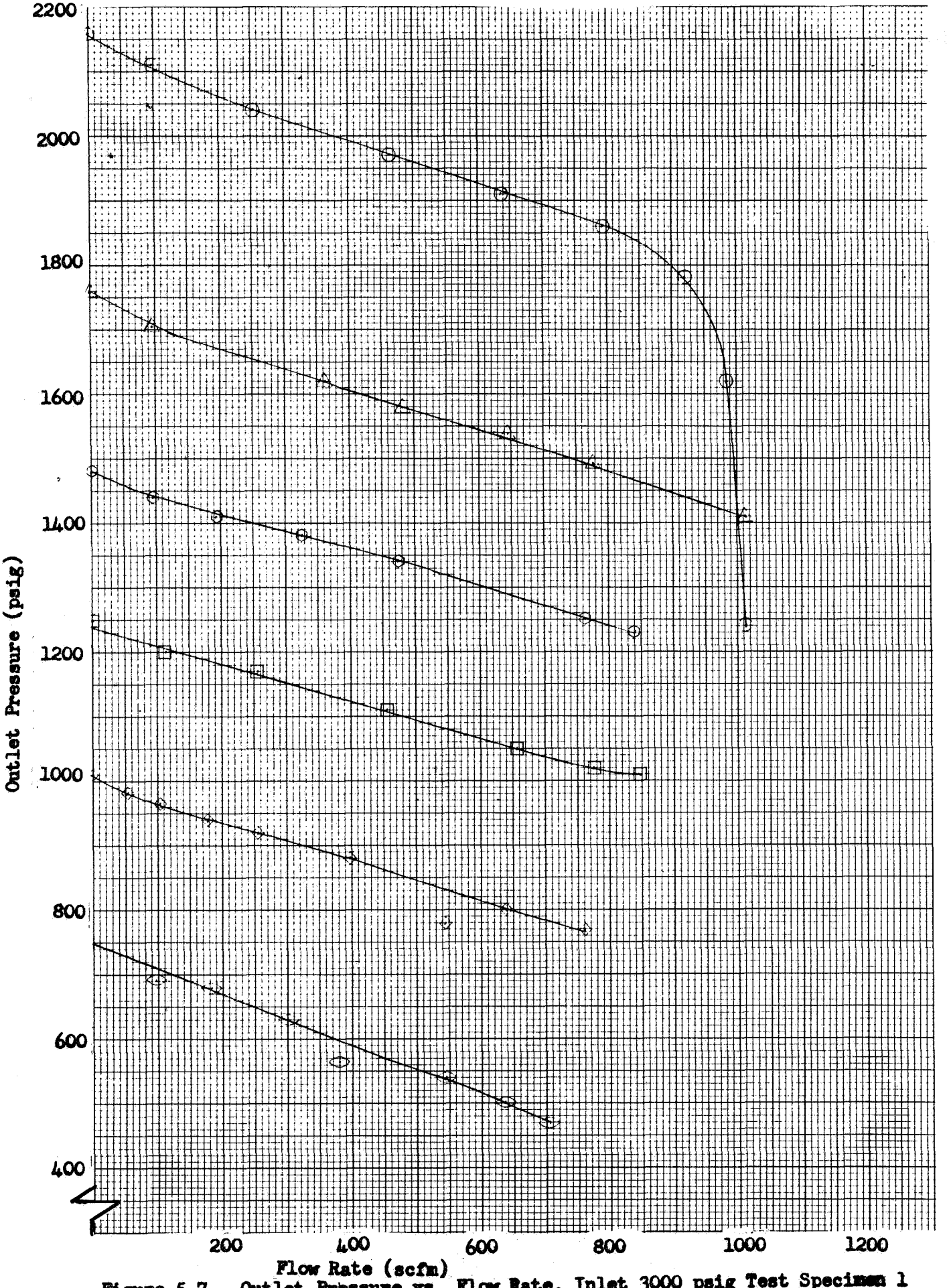


Figure 5-7. Outlet Pressure vs. Flow Rate, Inlet 3000 psig Test Specimen 1

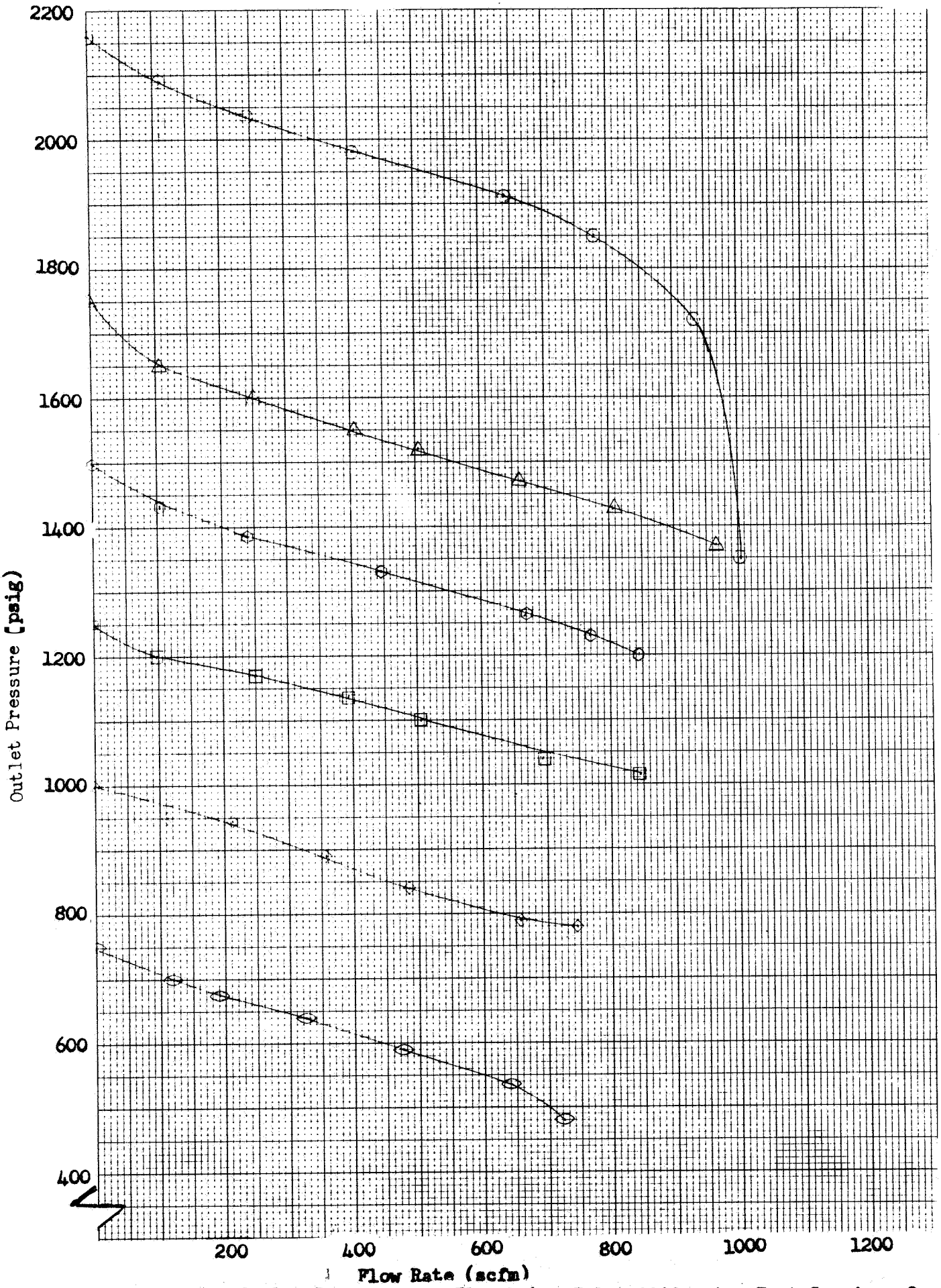


Figure 5-8. Outlet Pressure vs. Flow Rate, Inlet 3000 psig, Test Specimen 2

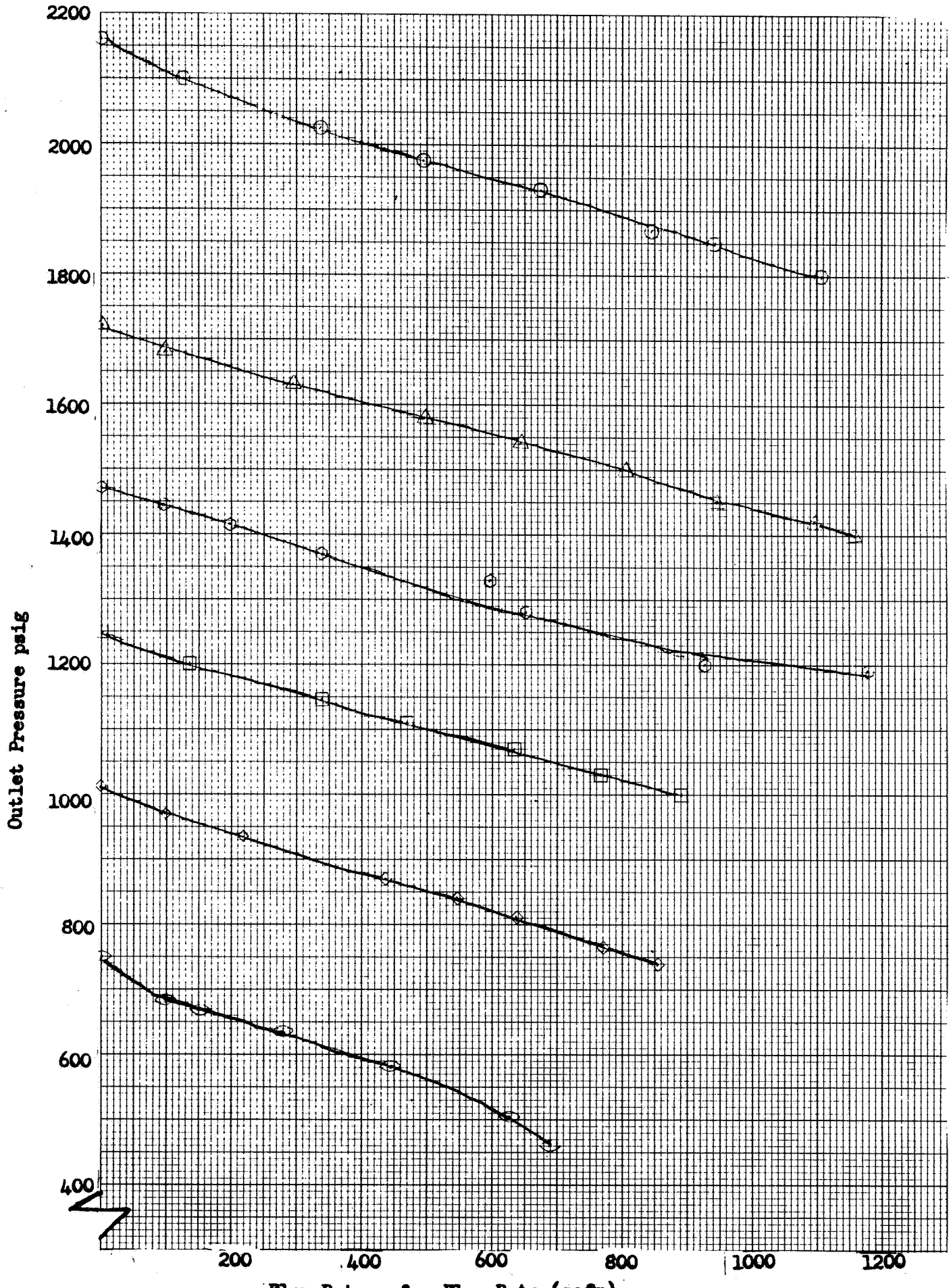


Figure 5-9. Outlet Pressure Vs. Flow Rate, Inlet 4000 psig, Test Specimen 1

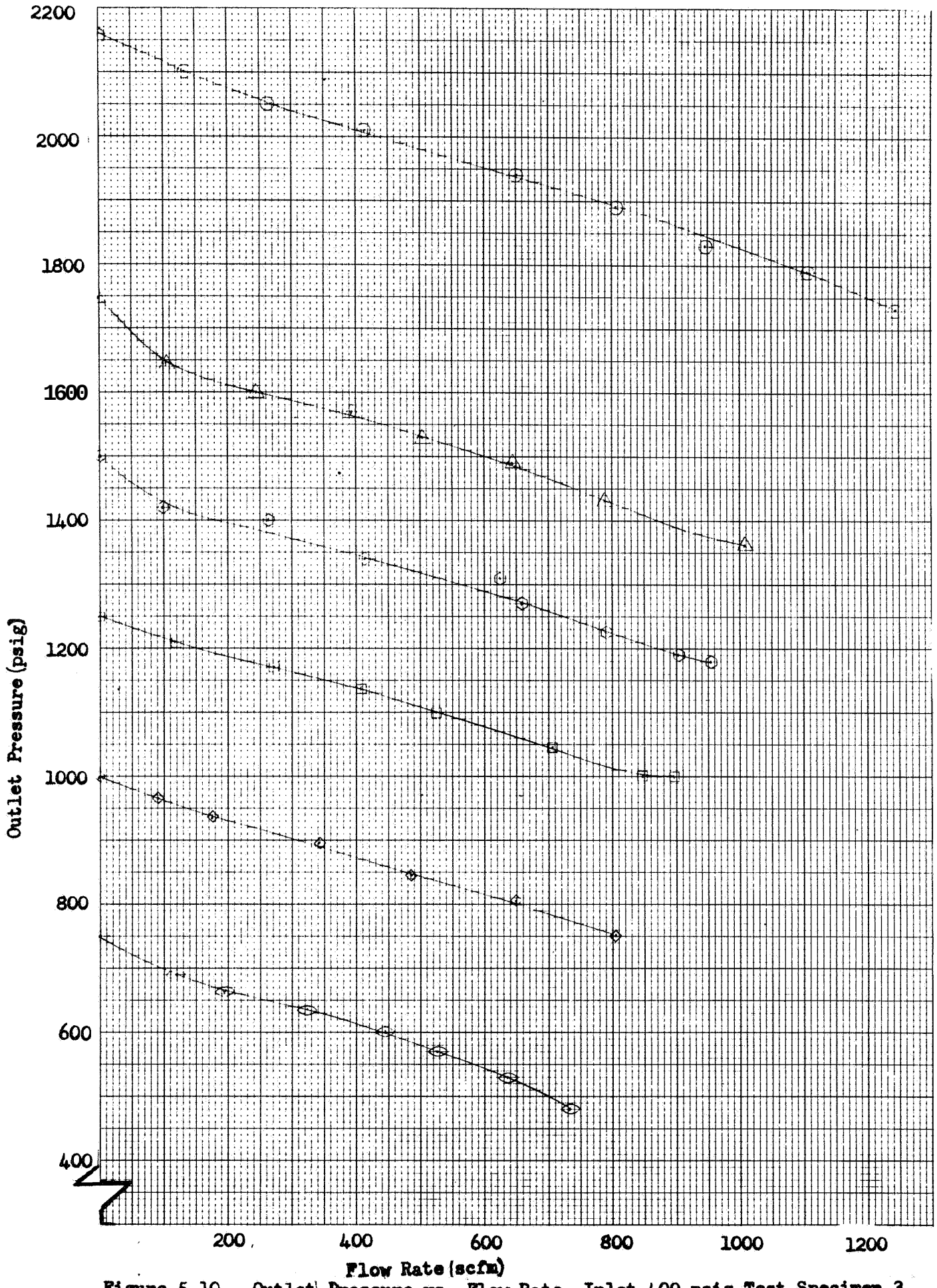


Figure 5-10. Outlet Pressure vs. Flow Rate, Inlet 400 psig Test Specimen 3

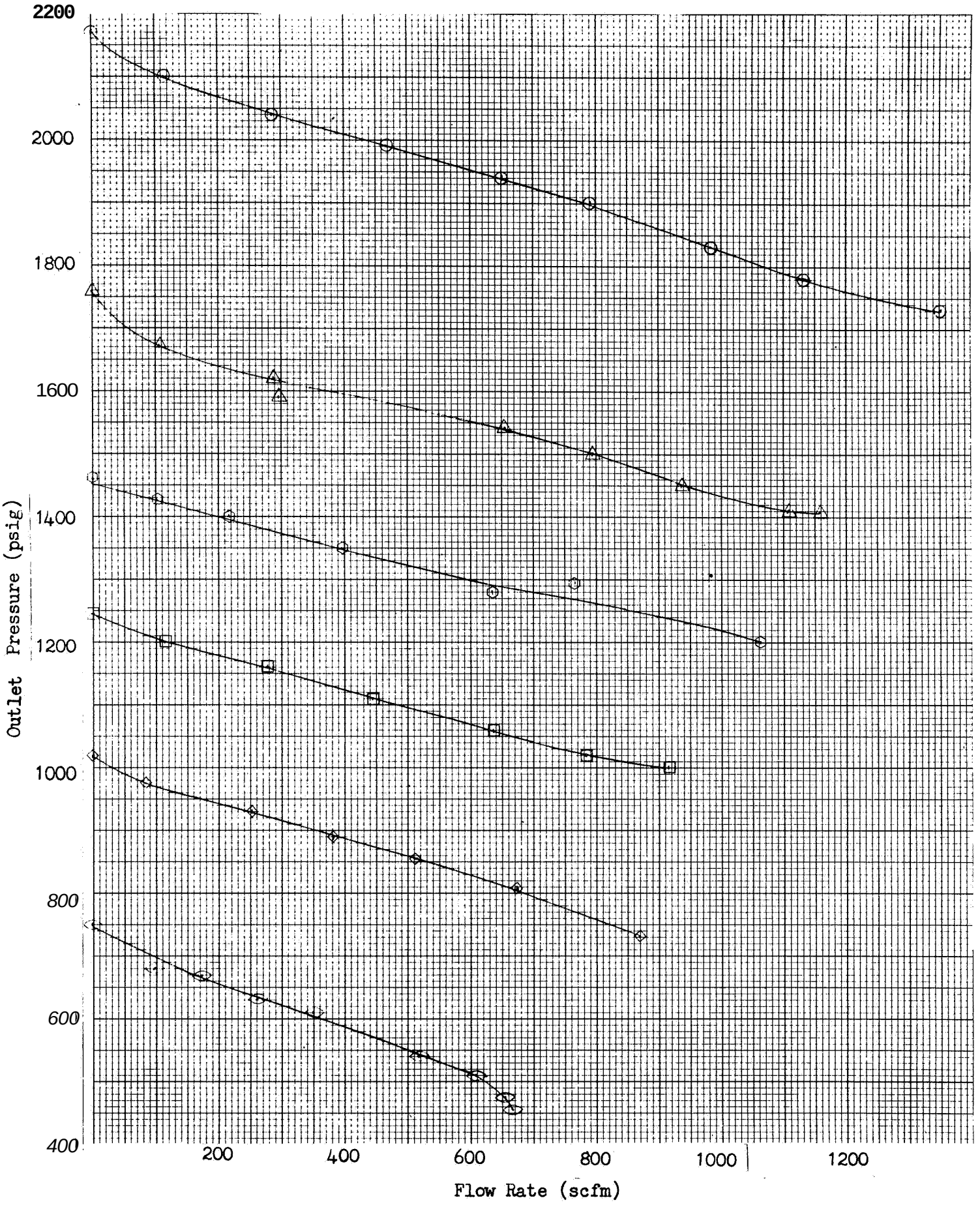


Figure 5–11. **Outlet** Pressure **vs.** Flow **Hate,** Inlet 4500-**psig,** Test Specimen 1

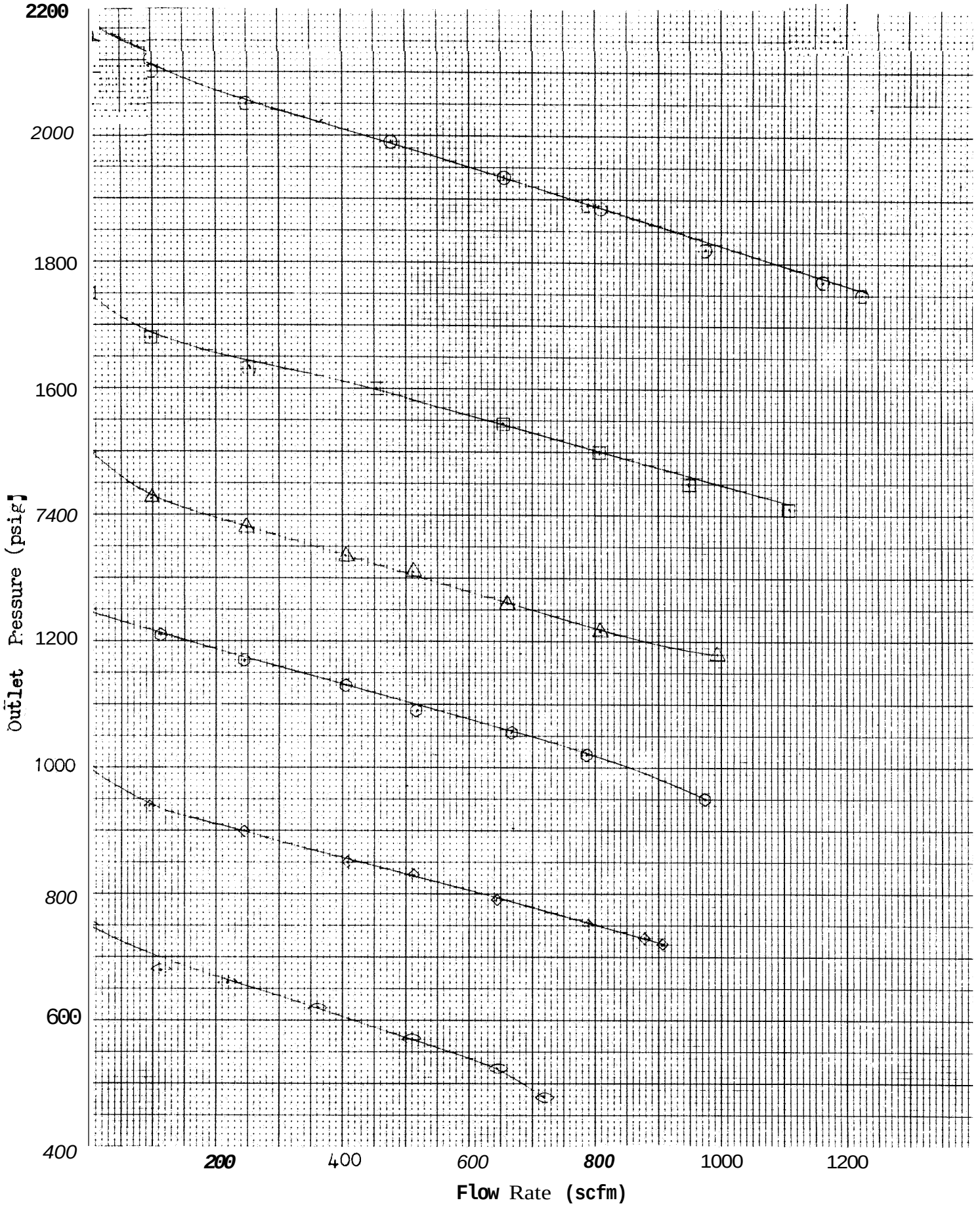


Figure 5–12. Outlet Pressure vs. Flow Rate, Inlet 4500-psig, Test Specimen 2

SECTION VI

PRESSURE REGULATION AND RELIEF TEST

6.1 TEST REQUIREMENTS

6.1.1 Specimens 1 and 3 shall be checked for regulating stability by varying inlet pressures from 1000 to 4500 psig. The stability shall be checked at each 1000-psig increment and also at 4500 psig. Outlet pressuree shall be set at 750, 1000, 1250, 1500, 1750, and 2160 psig for each inlet pressure increment; however, checks shall not be made when the outlet pressure exceeds the inlet pressure. Outlet pressuree shall be monitored for fluctuations.

6.1.2 Venting capability of the specimen shall be checked at each outlet pressure setting by applying a back pressure to the outlet port until the specimen vents. Venting and reseating pressures shall be recorded.

6.2 TEST PROCEDURE

6.2.1 The pressure regulating and relief test setup was assembled as shown in figure 6-1 utilizing the equipment listed in table 6-1.

6.2.2 All hand valves were closed and all regulators were adjusted for zero outlet pressure.

6.2.3 Hand valve 3 was opened and the supply pressure was read on gage 5.

6.2.4 Regulator 6 was adjusted to provide a specimen inlet pressure of 1000 psig a8 read on gage 7.

6.2.5 The test specimen was adjusted to provide an outlet pressure of 750 psig as read on gage 9.

6.2.6 The specimen inlet pressure was increased successively to 2000, 2000, 4000 and 4500 paig using regulator 6. Inlet pressure was read on gage 7. Gage 9 was monitored for fluctuations in specimen outlet pressure.

6.2.7 Regulator 11 was adjusted until gage 12 agreed approximately with gage 9 while gage 7 still indicated 4500 paig. Hand valve 13 was opened. The specimen outlet pressure was increased by adjusting regulator 11 until the test specimen vented. The test specimen outlet pressure at which venting occurred was recorded.

Regulator 11 was adjusted until the teat specimen outlet pressure decreased enough to cease venting. The reseating pressure was recorded as indicated by gage 9.

6.2.8 Procedures described in 6.2.4 through 627 were repeated for test specimen outlet pressures of 1000, 1250, 1500, 1750 and 2100 psig. Steps in which the inlet pressure was less than the outlet pressure were omitted.

6.2.9 Tent data were recorded.

6.3 TEST RESULTS

6.3.1 No significant fluctuations in outlet pressures were observed. for either teat specimen 1 or 3.

6.4 TEST DATA

Vent pressures and reseat pressures for test specimens 1 and 3 are presented in tables 6-2 and 6-3.

Table 6-1. Pressure Regulation and Relief Test Equipment List

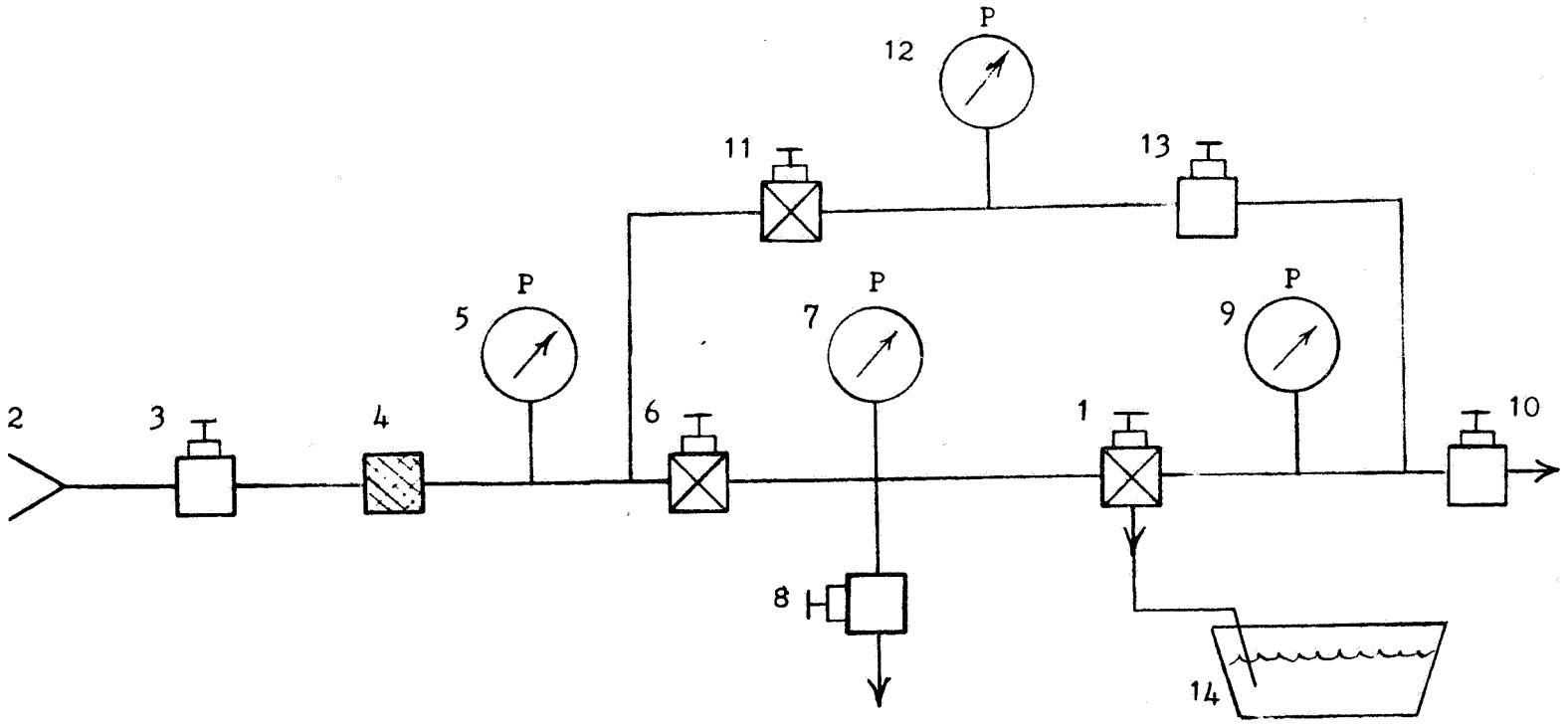
Item No.	Item	Manufacturer	Model/ P'art' No.	Serial No.	Remarks
1	Test Specimen	Marotta	RV74EB	106,101 105	Pressure Regulator
2	GN_2 Supply	CCSD	NA	NA	5000-psig
3	Hand Valve	Dragon	AN-4	NA	1/1/2-inch
4	Filter	Bendix	5-6-13461-16-B-0	NA	2-micron absolute
5	Pressure Gage	Ashcroft	NA	NASA 200613-3	0-to 20,000-psig ±.5% FS accuracy Cal. date 10/11/66
6	Regulator	Tescom Corp.	26-1021-10	1529	5000-psig inlet 0-to 4500-psig outlet
7	Pressure Gage	Heise	NA	NASA 200613-5	0-to 5000-psig ±0.1% FS accuracy Cal. date 10/11/66
8	Hand Valve	Robbina Aviation	SSK6250-4T	NA	1/4-inch
9	Pressure Gage	Heiae	NA	NASA 200613-7	0-to 5000-psig ±0.1% FS accuracy Cal, date 10/11/66
10	Hand Valve	Anderson Greenwood & Co.	H1VP-8T	NA	1/2-inch
11	Regulator	Tescom Corp,	M/N 26-1021-20	3024	5000-psig inlet 0-to 2500-psig outlet
12	Pressure Gage	Heise	NA	NASA 014231	0-to 10,000-psig ±1% FS accuracy Cal. date 10/11/66
13	Hand Valve	Aminco	44-13126	NA	1/4-inch
14	Water Tank	CCSD	NA	NA	

Table 6-2. Vent and Reseat Pressures

Test Specimen 1 S/N 106			
Inlet Pressure	Outlet Pressure (psig)	Vent Pressure (psig)	Reseat Pressure (psig)
4500	750	790	775
4500	1000	1040	1010
4500	1250	1290	1270
4500	1500	1535	1520
4500	1750	1770	1760
4500	2160	2185	2180

Table 6-3. Vent and Reseat Pressures

Test Specimen 3 S/N 105			
Inlet Pressure	Outlet Pressure (psig)	Vent Pressure (psig)	Reseat Pressure (psig)
4500	750	780	775
4500	1000	1080	1075
4500	1250	1260	1250
4500	1500	1545	1535
4500	1750	1785	1780
4500	2160	2225	2220



NOTE: All lines $\frac{1}{4}$-inch.
Refer to table 6-1 for item identification.

Figure 6-1. Pressure Regulation and Relief Test Schematic

SECTION VII

HIGH TEMPERATURE TEST

7.1 TEST REQUIREMENTS

7.1.1 A high temperature test will be performed on test specimen 1 to determine whether the environment causes degradation or deformation.

7.1.2 The rated high temperature is 160°F (+4, -0°F).

7.1.3 A functional test shall be performed during the high temperature test using GN_2 as the test medium.

7.2 TEST PROCEDURE

7.2.1 The test specimen was placed in a high temperature chamber as shown in figures 4-1 and 7-1 using the equipment listed in table 4-1.

7.2.2 A functional test was performed eight hours prior to the high temperature test.

7.2.3 The chamber was adjusted to 160°F (+4, -0°F) with a maximum temperature change rate of 1 degree per minute and with a relative humidity of 20 percent (±5 percent).

7.2.4 When the temperature became stabilized, the chamber was maintained as specified in 7.2.3 for 72 hours.

7.2.5 A functional test was performed at 160°F after 72 hours.

7.2.6 After completion of the functional test, the chamber temperature was reduced to room ambient conditions at the rate of 1 degree per minute.

7.2.7 The teat specimen was visually inspected and functionally tested within 1 hour following the return of the specimen to room ambient conditions.

7.3 TEST RESULTS

7.3.1 The specimen performed satisfactorily during the functional test performed at 160°F and during the functional test performed after return to room ambient conditions.

7.4 TEST DATA

7.4.1 The data presented in tables 7-1, 7-2 and 7-3 were recorded before, during and after the 160°F (+4, -0°F) environment.

Table 7-1. Functional Teat Before High Temperature Test

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 minutes (psig)
1	3000	1500	1485
2	3000	1490	1490
3	3000	1515	1500
4	3000	1500	1490
5	3000	1490	1490

Table 7-2. Functional Teat During High Temperature Teat

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1480	1475
2	3000	1475	1475
3	3000	1470	1470
4	3000	1470	1470
5	3000	1470	1470

Table 7-3. Functional Test After High Temperature Teat

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1505	1495
2	3000	1500	1498
3	3000	1505	1500
4	3000	1500	1500
5	3000	1500	1495

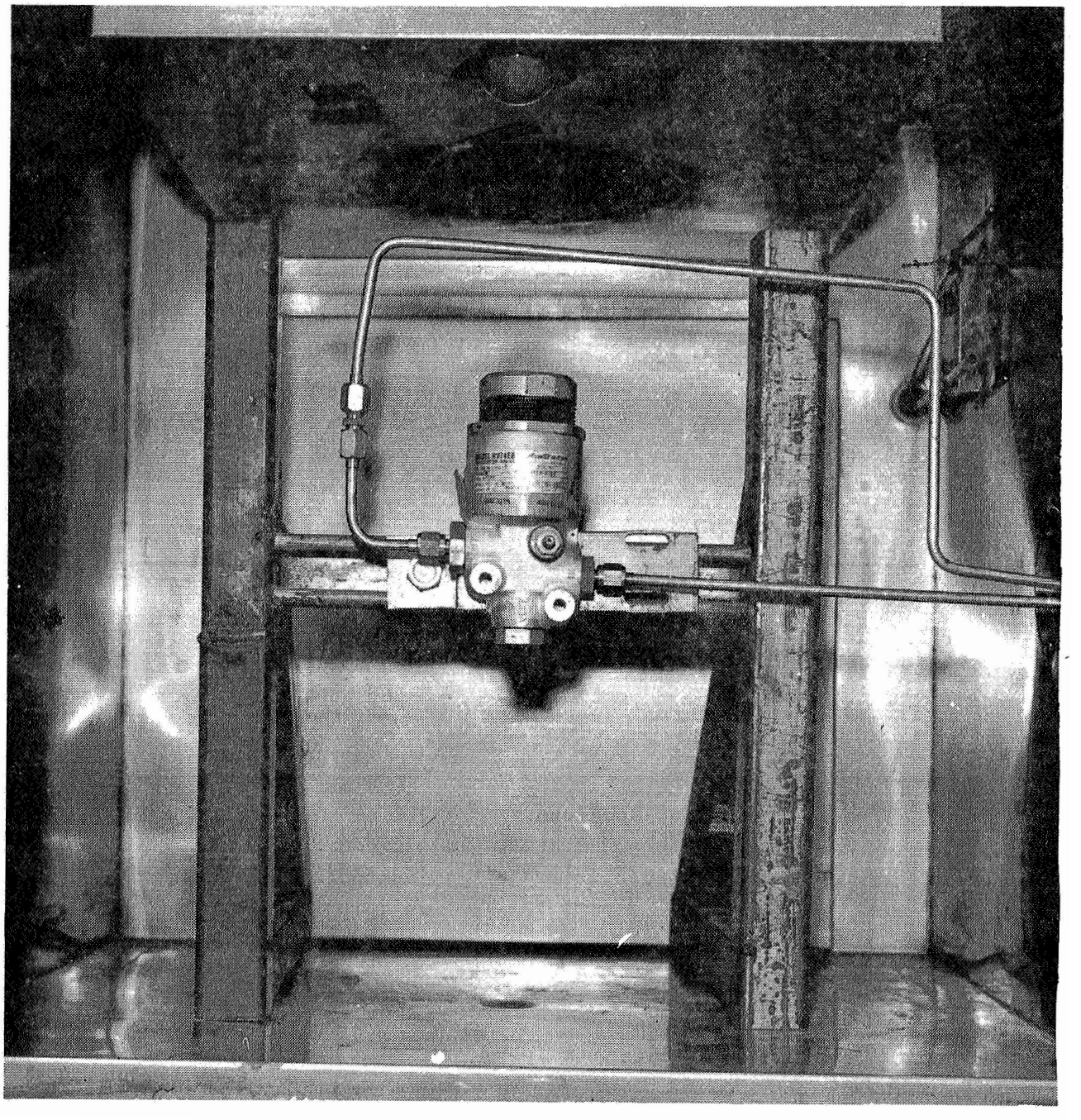


Figure 7–1. Nigh and Low Temperature Test Setup

SECTION VIII

LOW TEMPERATURE TEST

8.1 TEST REQUIREMENTS

8.1.1 A low temperature test shall be performed on test specimen 1 and 3 to determine whether the environment causes degradation or deformation.

8.1.2 The specified low temperature is 0°F (+0, -4°F). The maximum temperature change rate shall be 1°F per minute.

8.1.3 A functional test shall be performed during the low temperature environment teat using GN_2 as the test medium.

8.2 TEST PROCEDURE

8.2.1 The test specimen was placed in the low temperature chamber as shown in figures 4-1 and 7-1 utilizing the equipment listed in table 4-1.

8.2.2 The chamber was adjusted to 0°F (+0, -4°F) with a maximum temperature change rate of 1 degree per minute relative humidity of 60 to 90 per cent.

8.2.3 A functional test was performed on the test specimen when the temperature became stabilized, Temperature stabilization represents a maximum temperature change rate of 4°F per hour as determined from instrumentation.

8.2.4 The test specimen was returned to ambient conditions and was visually inspected and functionally tested within one hour.

8.2.5 Test data were recorded.

8.3 TEST RESULTS

8.3.1 A significant increase in the range of outlet pressure occurred at 0°F for test specimen 3. This phenomena was attributed to the freezing of moisture in the polyurethane packing between the Bellville washers in the loading spring. The hardened packing could have increased the tension in the spring thereby increasing the outlet pressure.

8.4 TEST DATA

8.4.1 The data presented in tables 8-1 through 8-6 for test specimens 1 and 3 were recorded during and after the 0°F environment.

Table 8-1. Functional Preceding Low Temperature Teat

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1500
2	3000	1540	1525
3	3000	1525	1525
4	3000	1535	1530
5	3000	1530	1530

Table 8-2. Functional During Low Temperature Teat

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (paig)	After 5 Minutes (psig)
1	3000	1565	1560
2	3000	1575	1515
3	3000	1560	1530
4	3000	1565	1515
5	3000	1560	1545

Table 8-3. Functional Following Low Temperature Test

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (paig)	After 5 Minutes (psig)
1	3000	1515	1505
2	3000	1515	1505
3	3000	1517	1510
4	3000	1520	1510
5	3000	1515	1510

No Leakage Observed

Table 8-4. **Functional** Preceding **Low** Temperature Teat

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1610	1595
2	3000	1590	1590
3	3000	1595	1585
4	3000	1585	1580
5	3000	1585	1580

Table 8-5. Functional During Low Temperature Test

Test Specimen 3 SW 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1700	1650
2	3000	1680	1650
3	3000	1675	1635
4	3000	1665	1645
5	3000	1675	1645

Table 8-6. Functional Following Low Temperature Test

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (paig)	After 5 Minutes (psig)
1	3000	1605	1590
2	3000	1585	1580
3	3000	1585	1585
4	3000	1585	1580
5	3000	1595	1588

SECTION IX

SURGE TEST

9.1 TEST REQUIREMENTS

9.1.1 Using dry air or nitrogen, pressurize test specimens 1 and 3 to determine whether the surge environment causes degradation or deformation.

9.1.2 Each surge cycle shall consist of pressurizing the inlet port from zero to 4500 psig within 100 milliseconds with the specimen set for zero outlet pressure. A total of 1000 surge cycles shall be conducted.

9.1.3 Functional tests shall be performed after 500 and 1000 cycles.

9.2 TEST PROCEDURE

9.2.1 The surge test setup was assembled as shown in figures 9-1 and 9-2 utilizing the equipment listed in table 9-1.

9.2.2 All hand valves were closed and regulator 6 was adjusted for zero outlet pressure.

9.2.3 Hand valve 3 was opened and the supply pressure was read on gage 5.

9.2.4 Hand valve 8 was opened and regulator 6 was adjusted to provide an outlet pressure of 4500 psig as indicated by gage 7. Hand valve 8 was closed.

9.2.5 Hand valve 10 was opened.

9.2.6 Timer 15 was adjusted to cycle solenoid valve 9 at approximately 30 cyclers per minute. Regulator 6 and valve 10 were adjusted as required to pressurize the specimen inlet from zero to 4500 psig within 100 milliseconds and to vent the specimen to zero psig. Data were recorded on oscillograph 17 using transducer 11.

9.2.7 One thousand surge cycles were performed. The test specimen was functionally tested after 500 and 1000 cycles.

9.2.8 All test data were recorded.

9.3 TEST RESULTS

9.3.1 No leakage or distortion was observed during functional tests performed at 500 and 1000 cycles on test specimens 1 and 3.

9.4 TEST DATA

9.4.1 Functional teat data taken after the surge test are presented in tables 9-2 through 9-7. A typical surge waveform as recorded during the test, is presented in figure 9-3.

Table 9–1. Surge Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Marotta Valve Corp	RV74EB	106, 101 105	Pressure Regulator
2	GN_2 Supply	CCSD	NA	NA	5000-psig
3	Hand Valve	Dragon	AN-4	NA	1-½-inch
4	Filter	Bendix	5-6-13461 16-B-0	MA	2-micron absolute
5	Pressure Gage	Ashcroft	NA	NASA 200613-3	0-to 20,000-psig ±0.5% FS accuracy Cal. date 10/11/66
6	Regulator	Tescom Corp.	26-1021-LO	1529	5000-psig inlet 0-to 4500-psig outlet
7	Pressure Gage	Heise	NA	NASA 200613-5	0-to 5000-psig ±0.1% FS accuracy Cal. date 10/11/66
8	Hand Valve	Robbins Aviation	SSKG250-4T	NA	¼-inch
9	Solenoid Valve	Marotta Valve Corp.	RV583	3695	3-way, normally open, ½-inch 0-6000-psig
10	Hand Valve	Anderson Greenwood & Co.	H1VP-87	NA	½-inch
11	Pressure Transducer	Consolidated Electrodynamics Corp	4-350-0001	2564	0-to 5000-psig ±0.5% FS accuracy Cal. date 9/20/66
12	Pressure Gage	Heiae	NA	NASA 200613-7	0–to 3000-psig ±0.1% FS accuracy Cal. date 10/11/66
13	Hand Valve	Anderson Greenwood & Co.	H1VP-87	NA	½-inch

Table 9-1. Surge Test Equipment List (Continued)

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
14	Power Supply	Perkin Electronics	MRST28-300A	NASA 009941	28-vdc, 3-amp
15	Timer	G.C. Wilson & Co.	M/N 1	NA	Cam operated
16	Counter	Durant	NA	NA	4-digit
17	Oscillograph Recorder	consolidated Electrodynamica Corp.	NA	NASA 017887	Cal. date 9/22/66

Table 9-2. Functional Preceding Surge Test

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1508	1503
2	3000	1515	1510
3	3000	1515	1500
4	3000	1505	1505
5	3000	1510	1510

Table 9-3. Functional Following 500 Surge Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1480	1470
2	3000	1500	1485
3	3000	1495	1480
4	3000	1500	1485
5	3000	1490	1475

Table 9-4. Functional Following 1000 Surge Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (paig)
1	3000	1500	1485
2	3000	1490	1490
3	3000	1515	1500
4	3000	1500	1490
5	3000	1490	1490

Table 9-5. Functional Preceding Surge Teat

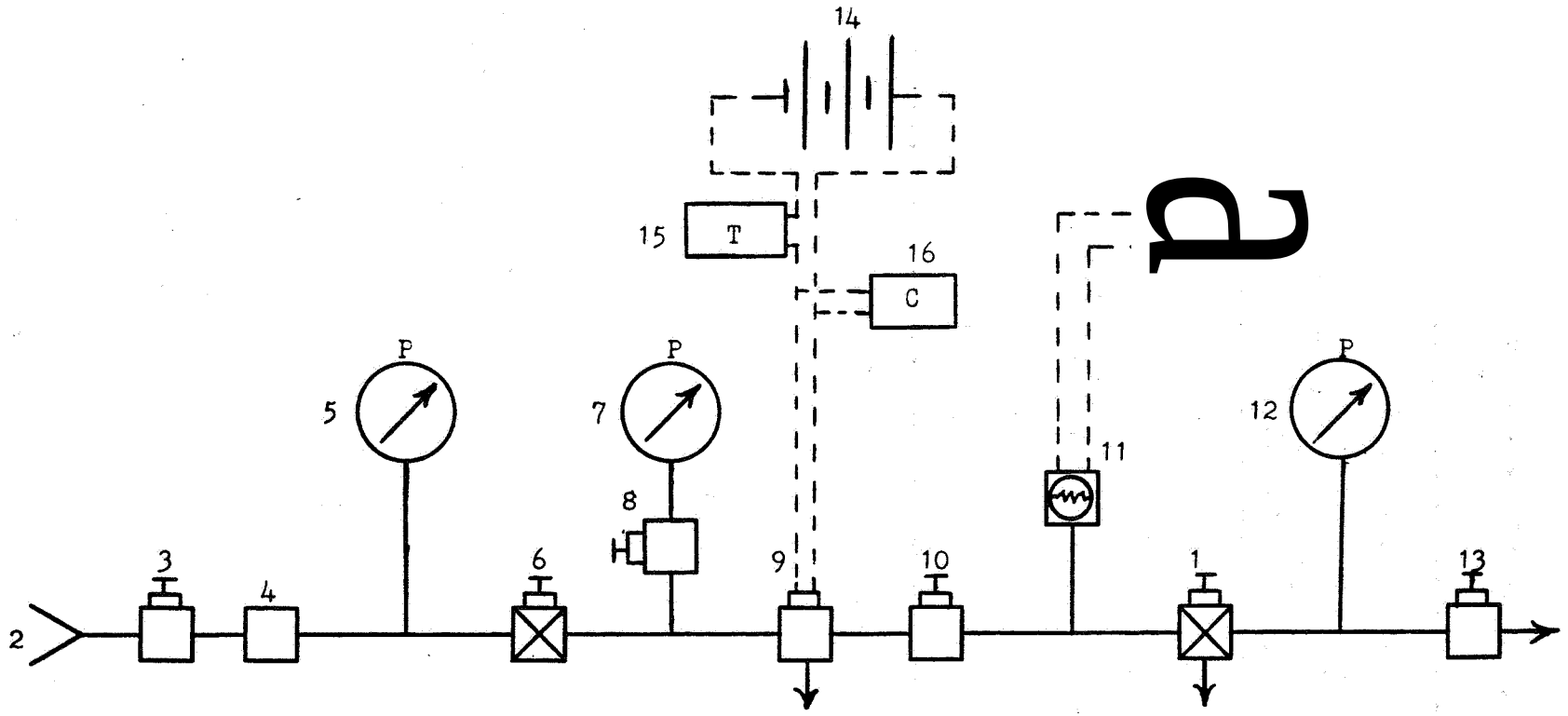
Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Preasure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1502	1692
2	3000	1500	493
3	3000	1505	1695
4	3000	498	1693
5	3000	1500	495

Table 9-6. Functional Following 500 Surge Cycles

Teat Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1480
2	3000	1480	1460
3	3000	1500	1490
4	3000	1460	1470
5	3000	1490	1480

Table 9-7. Functional Following 100 Surge Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1530	1510
2	3000	1525	1500
3	3000	1535	1510
4	3000	1530	1515
5	3000	1545	1525



Note: All lines $\frac{1}{2}$ inch, except for gage lines which are $\frac{1}{4}$ inch. Refer to table 9-1 for item identification.

Figure 9-1 Surge Test Schematic

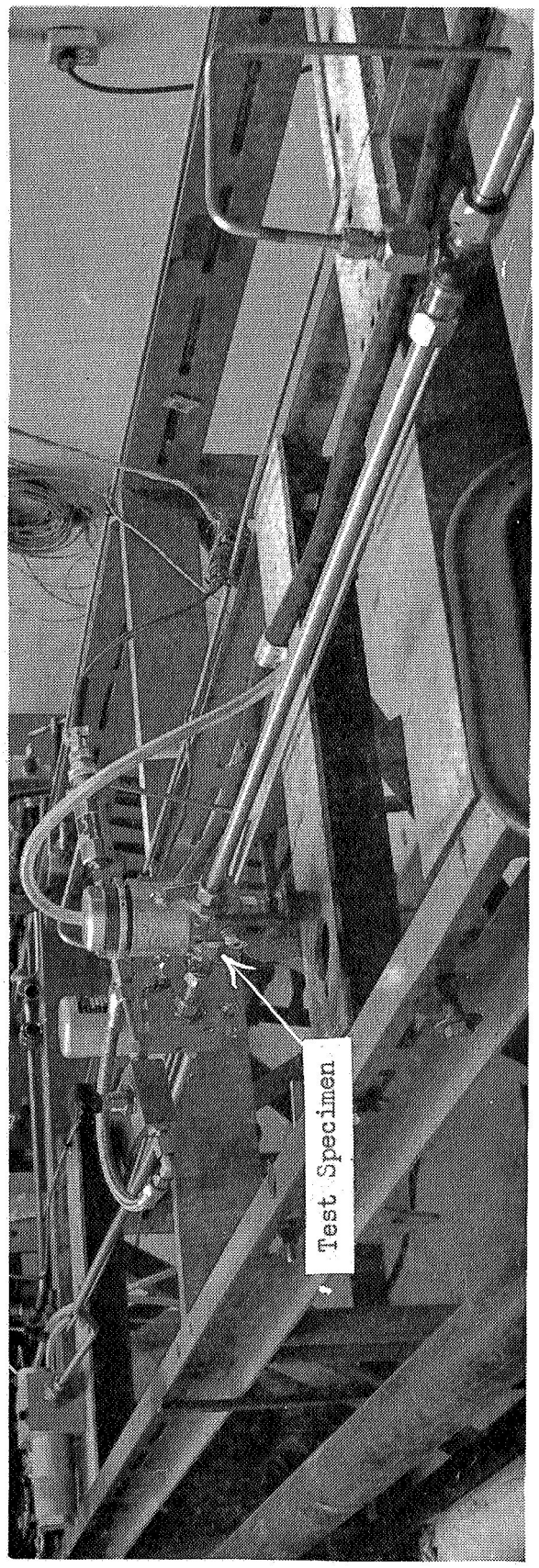


Figure 9-2. Surge Test Setup

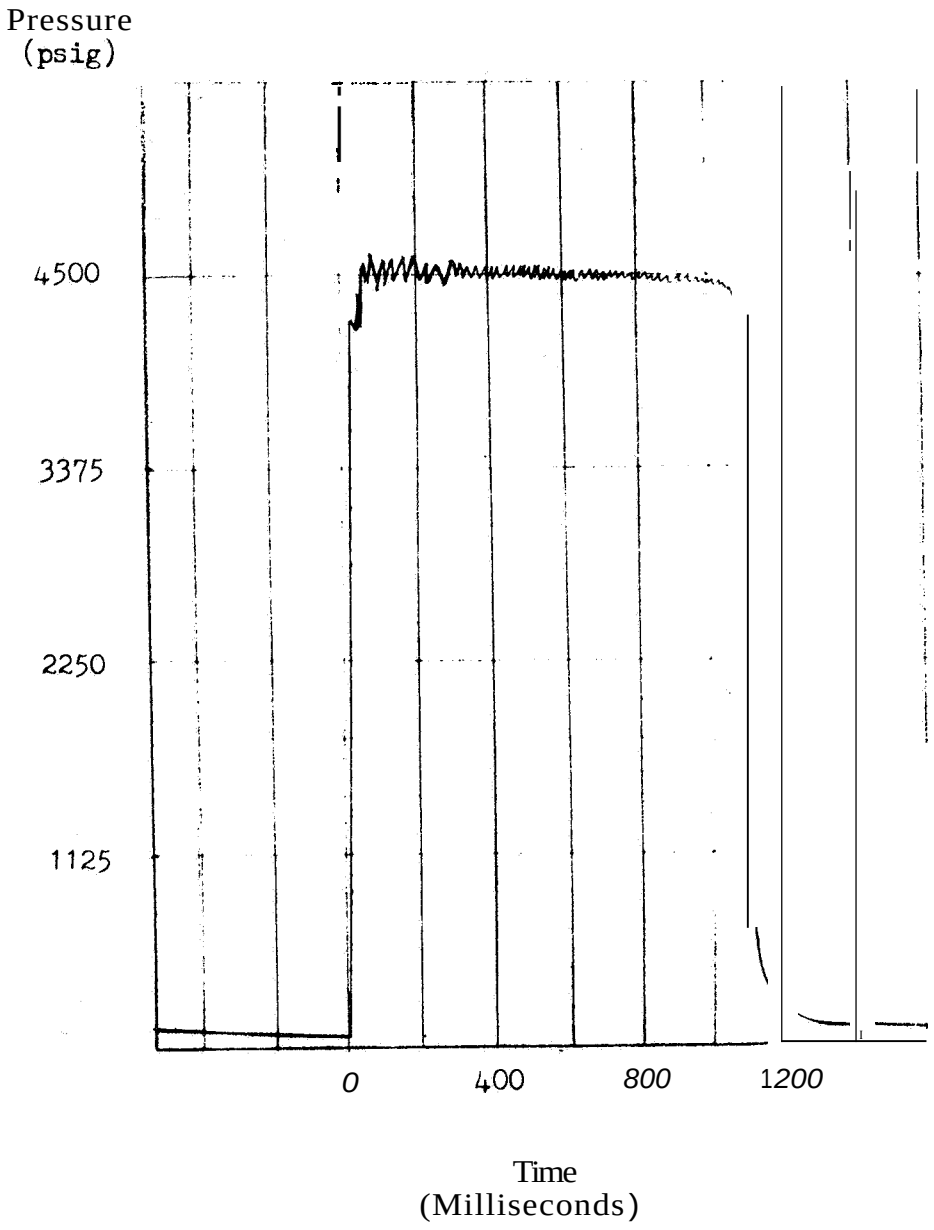


Figure 9–3. Typical Surge Wave Form

SECTION X

VIBRATION TEST

10.1 TEST REQUIREMENTS

A vibration test will be performed on test specimens 1 and 2 while the specimens are set to reduce pressure from 3000 to 1500 psig to determine whether the environment causes degradation or deformation. Vibration shall be applied along three mutually perpendicular axes. The test shall be performed in accordance with KSC-STD-164(D), section 9, figures 9-1 and 9-2, level C.

10.1.2 RESONANT FREQUENCY SEARCH

10.12.1 The fixture/test specimen assembly shall be exposed to sinusoidal vibration at the input levels shown in table 10-1. A frequency range of 5 to 3000 cps shall be traversed logarithmically in directions of both increasing and decreasing frequency over a time period not to exceed 15 minutes per axis. Actual time shall be noted. All fixture and test specimen resonant frequencies and structural member in resonance shall be noted. In addition, critical frequencies of the test specimen shall be noted. Critical frequencies are defined as those frequencies at which functional degradation occurs.

Table 10-1. Resonant Frequency Search Levels

Frequency (cps)	Displacement (DA inch)	Acceleration (g)
5 to 65	0.01	--
65 to 3000	--	2

10.1.3 SINUSOIDAL SWEEP

10.13.1 In one 20-minute sweep, the frequency range shall be scanned logarithmically from 10 to 2000 cps and back to 10 cps. Critical frequencies of the test specimen shall be noted. The test item shall be functionally tested after this test has been completed.

The sinusoidal sweep input levels shall be as shown in table 10-2.

Table 10-2. Sinusoidal Sweep Vibration Levels

Frequency (cps)	Displacement (DA inch)	Acceleration (g)
10 to 65	0.1	--
65 to 2000	--	20

10.1.4 RANDOM EXCITATION

10.1.4.1 The test specimen shall be exposed to random vibration at the specified levels over a frequency range from 10 to 2000 cps for 5 minutes. The test specimen shall be functionally tested after this test has been completed. The specified random input levels shall be as shown in table 10-3.

Table 10-3. Random Excitation Vibration Levels

Frequency (cps)	Slope (db/octave)	PSD (g^2/cps)
10 to 100	+6	--
100 to 1000	--	0.05
1000 to 2000	-6	--

10.1.5 Acceleration shall be measured at the test assembly by accelerometers mounted on the assembly.

10.1.6 The vibration teat shall be conducted in three mutually perpendicular axes. The previously described test — is for one axis and shall be completed before proceeding to the next axes.

10.2 TEST PROCEDURE

10.2.1 The test specimen was mounted on the vibration device for vibration in the X-axis as shown in figures 10-1 and 10-2 utilizing the equipment listed in table 10-4.

10.2.2 All hand valves were closed and regulator 6 was adjusted for zero outlet pressure.

10.2.3 Hand valve 3 was opened and the supply pressure read on gage 5.

10.2.4 Hand valve 7 was opened.

10.2.5 Regulator 6 was adjusted to provide a specimen inlet pressure of 3000 psig as read on gage 9.

10.2.6 The specimen was adjusted to provide an outlet pressure of 1500 psig as read on gage 12.

10.2.7 During all periods of vibration, the condition specified in 10.2.5 and 10.2.6 were maintained. Changes in specimen outlet pressure were monitored.

10.2.8 After each period of vibration, hand valve 3 was closed and the system was vented by opening hand valves 8 and 12.

10.2.9 RESONANT FREQUENCY SEARCH

10.2.9.1 In 15 minutes the frequency range from 5 to 3000 cps to 5 cps was scanned for each of the three axes. Input levels are as shown in table 10-1.

10.2.9.2 Actual search time was recorded.

10.2.9.3 All fixture and test item resonant frequencies were recorded.

10.2.10 SINUSOIDAL SWEEP TEST

10.2.10.1 A functional test had been performed 40 hours prior to beginning the vibration test.

10.2.10.2 In 20 minutes the frequency was logarithmically scanned from 10 to 2000 cps and back to 10 cps. Input levels are shown in table 10-2.

10.2.10.3 All critical frequencies were recorded.

10.

10.2.11 RANDOM EXCITATION TEST

10.2.11.1 The test specimen was subjected to 5 minutes of random excitation. The specified random input levels are shown in table 10.3.

10.2.12 A functional test was performed after all teat — in the X-axis was completed.

10.2.13 The procedures described in 10.2.1 and 10.2.11 were repeated for vibration in the Y and Z axes. A functional teat was performed after all vibration was completed in each axis.

10.2.14 All test data were recorded.

10.3 TEST RESULTS

10.3.1 No leakage or distortion was observed during vibration testing or during functional testa.

10.4 TEST DATA

10.4.1 Figures 10-3 and 10-4 are typical vibration plots of the control accelerometer. Tables 10-5 through 10–11 present the data taken from functional teats performed during the vibration testing.

Table 10-4. Vibration Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Marotta Valve Corp,	RV74EB	106, 101 105	Pressure Regulator
2	GN_2 Supply	CCSD	NA	NA	3500-psig
3	Hand Valve	Robbins Aviation Corp	SSKG250-4T	NA	¼-inch
4	Filter	Bendix	5-6-13461-21 16-B-0	NA	2-micra' abaolute
5	Pressure Gage	Ashcroft	NA	NASA 109 -1007-B	0-to 5,000-psig ±2% FS accuracy Cal. date 10/14/66
6	Regulator	Tescom	26-1002 -21	3485	3500-psig inlet 0-to 3000-psig outlet
7	Hand Valve	Robbins	SSKG250 -4T	NA	¼-inch
8	Hand Valve	Robbins	SSKG250-4T	NA	¼-inch
9	Pressure Gage	Heise	NA	NASA B/T 15537	0-to 5000-psig ±0.1% FS accuracy Cal. date 8/24/66
10	Flexible Hose		NA	NA	¼-inch Proof Pressure 6000-psig
11	Flexible Hose		NA	NA	¼-inch Proof Pressure 6000-psig
12	Pressure Gage	Heiss	NA	NASA B/T 10644	0-to 3500-psig ±0.1% FS accuracy Cal. date 11/16/66

Table 10–4. Vibration Test Equipment List (Continued)

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
13	Hand Valve	Robbina Aviation	BSKG250-4T	NA	¼-inch
14	Vibration Fixture	CCSD	NA	NA	6061T6A1
15	Vibration Exciter	MB	C-10	NA	NA
16	Monitoring Accelerometer	Endevco	2220	NASA 95-1129-5	20 cps .5 Amplitude, ±3.5% of measurement; frequency, ±1.5% or 2 cps Cal. date 10/18/66
17	Control Accelerometer	Endevco	2233	NASA 97-1026-B	Amplitude, ±3.5% of measurement; frequency, ±1.5% or 2 cps Cal. date 10/16/66
18	Monitoring Accelerometer	Endevco	2220	NASA 95-1480-5	20 cps .5 Amplitude, ±3.5% of measurement; frequency, ±1.5% or 2 cps Cal. date 10/18/66

Table 10-5. Functional Preceding Vibration Test

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Preasure	
		Initial (psig)	After 5 minutes (psig)
1	3000	1505	3495
2	3000	1500	1498
3	3000	1505	1500
4	3000	1500	1500
5	3000	1500	3495

Table 10-6. Functional Following Sinusoidal Sweep Test, X-Axis

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 minutes (psig)
1	3000	1490	3480
2	3000	1490	3490
3	3000	1495	3495
4	3000	1490	1490
5	3000	1500	1500

Table 10-7. Functional Following Random Excitation Test, X-Axis

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1490	1490
2	3000	1490	1485
3	3000	1485	1480
4	3000	1485	1485
5	3000	1485	1480

Table 10-8. Functional Following Sinusoidal Sweep Test, Y-Axis

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Hinutea (psig)
1	3000	1490	1490
2	3000	1485	1485
3	3000	1485	1485
4	3000	1485	1480
5	3000	1500	1490

Table 10-9. Functional Following Random Qcitation Test, Y-Axis

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1485	1490
2	3000	1485	1480
3	3000	1485	1485
4	3000	1495	1485
5	3000	1485	1480

Table 10-10. Functional Following Sinusoidal Sweep Test, Z-Axis

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (paig)	After 5 Hinutea (psig)
1	3000	1485	1475
2	3000	1485	1480
3	3000	1490	1485
4	3000	1485	1485
5	3000	1485	1485

Table 10–11. Functional Following Random Exeitation Test, Z-Axis

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (paig)
1	3000	u95	1485
2	3000	1495	1485
3	3000	1490	1480
4	3000	1490	1480
5	3000	1490	1485

Table 10-12. Functional Preceding Vibration Test

Teat Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	\fter 5 Minutes (psig)
1	3000	1530	1525
2	3000	1525	1525
3	3000	1525	1525
4	3000	1520	1525
5	3000	1515	1525

Table 10-13. Functional Following Sinusoidal Sweep Test, X-Axis

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1520	1530
2	3000	1530	1520
3	3000	1515	1520
4	3000	1515	1520
5	3000	1515	1520

Table 10-14. Functional Following Random Excitation Test, X-Axis

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1510	1520
2	3000	1510	1520
3	3000	1510	1520
4	3000	1515	1520
5	3000	1510	1525

Table 10-15. Functional Following Sinusoidal Sweep Teat, **Y-Axis**

Test Specimen S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1530	1535
2	3000	1510	1535
3	3000	1510	1535
4	3000	1510	1530
5	3000	1505	1525

Table 10-16. Functional Following Random Excitation Teat Y-Axis

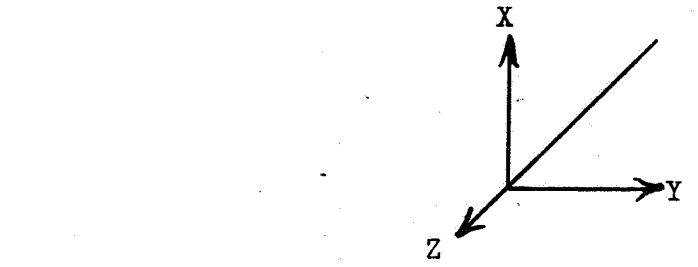
Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (prig)
1	3000	1510	1500
2	3000	1500	1520
3	3000	1500	1520
4	3000	1500	1520
5	3000	1500	1520

Table 10-17. Functional Following Sinusoidal Sweep Test, 2-Axis

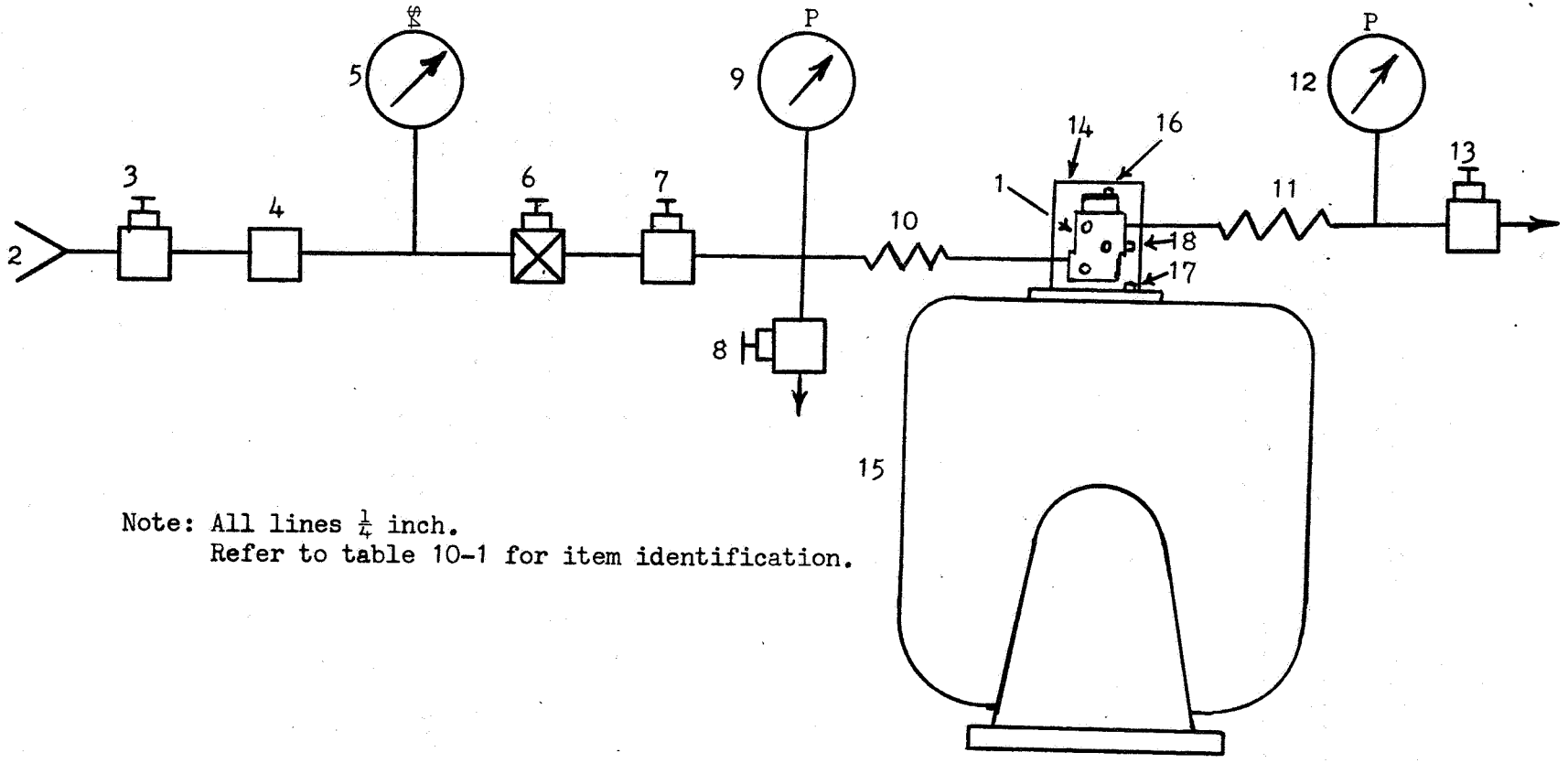
Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1540	1535
2	3000	1530	1535
3	3000	1530	1535
4	3000	1525	1535
5	3000	1525	1535

Table 10-18. Functional Following Random Excitation Test, 2-Axis

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1520	1535
2	3000	1520	1535
3	3000	1540	1535
4	3000	1520	1535
5	3000	1525	1535



Typical axis designation



Note: All lines $\frac{1}{4}$ inch.
Refer to table 10-1 for item identification.

Figure 10-1. Vibration Test Schematic

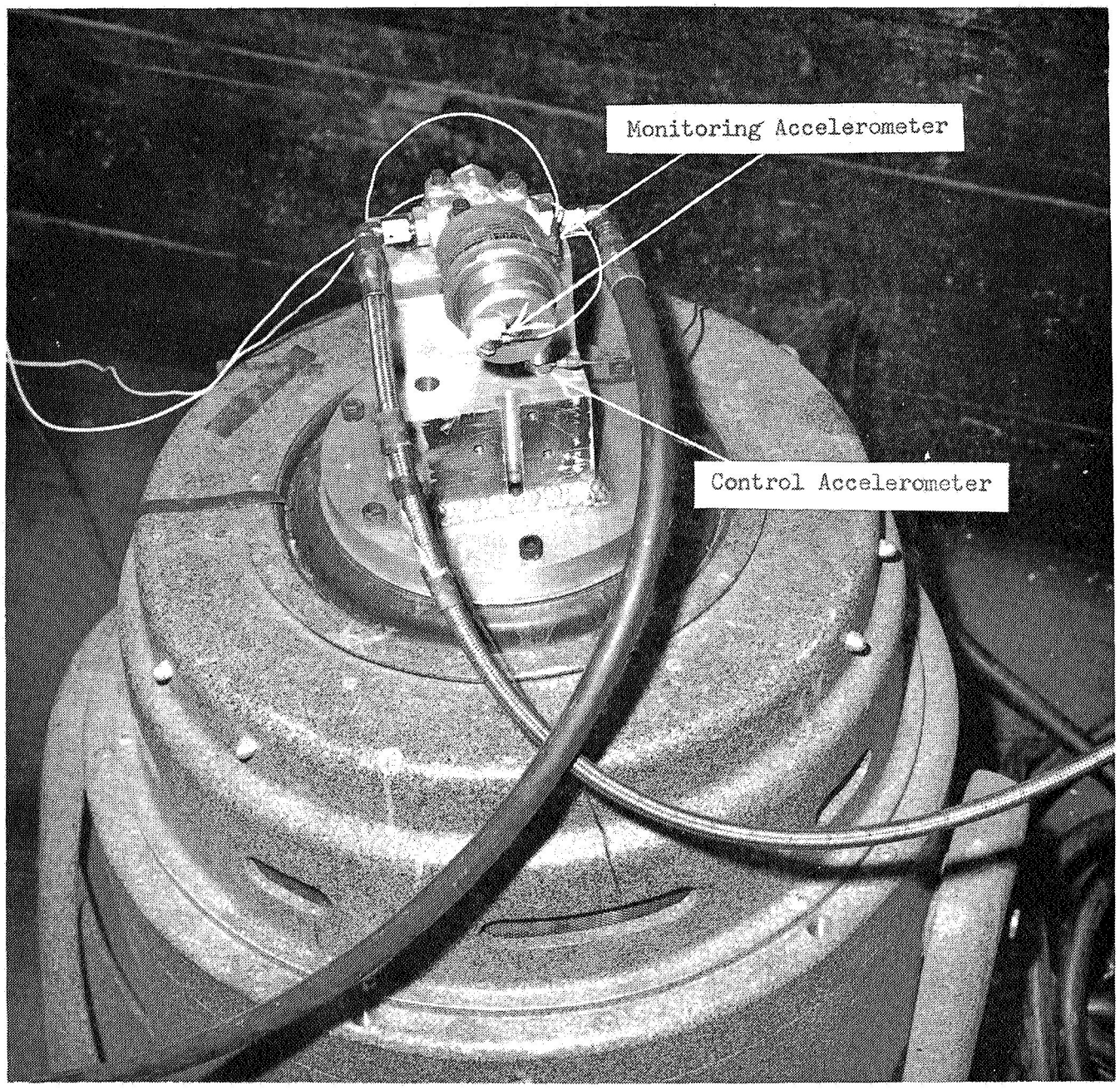


Figure 10-2. Vibration Test Setup, Z-Axis

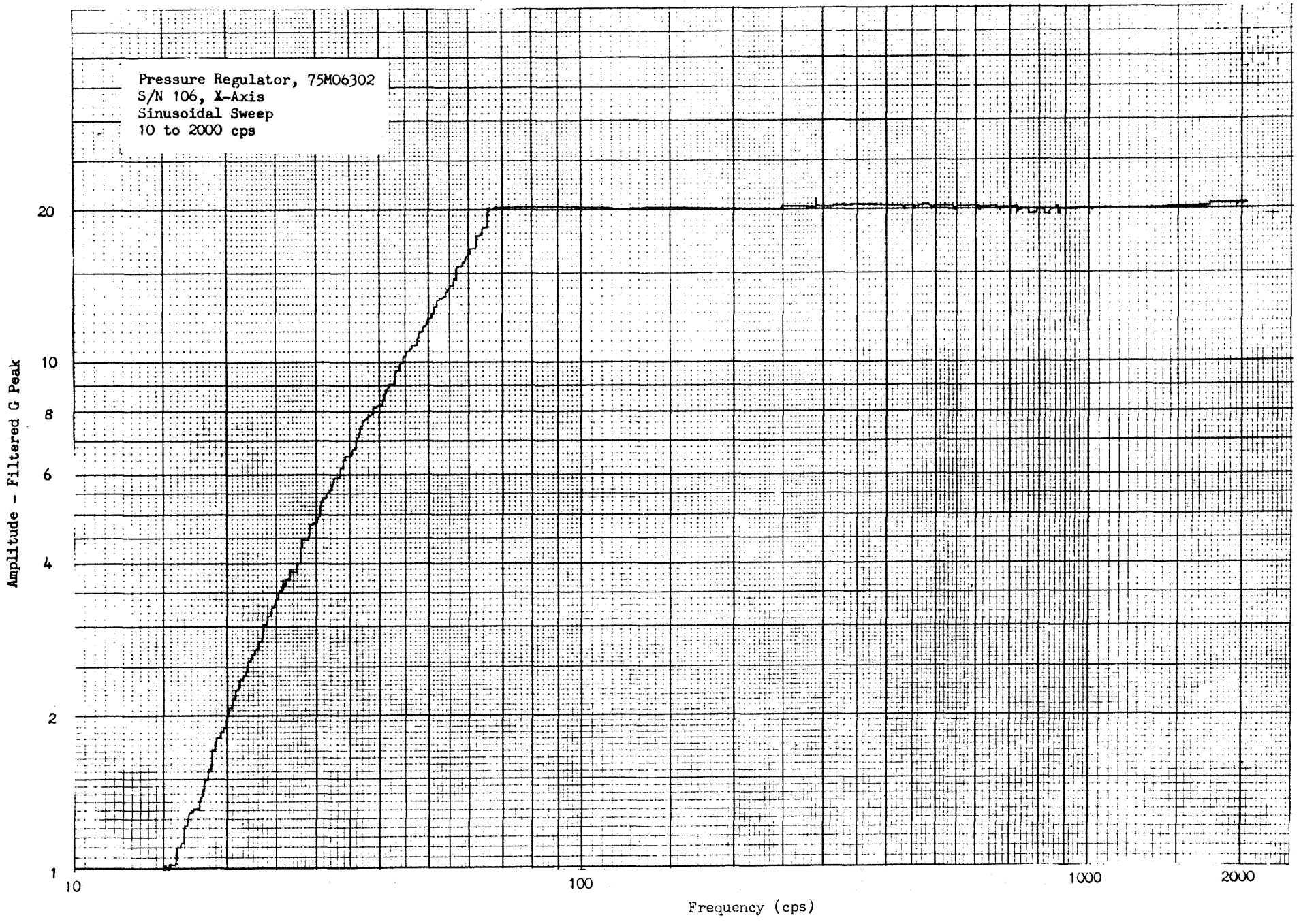


Figure 10-3. Typical Vibration Plot - Control Accelerometer

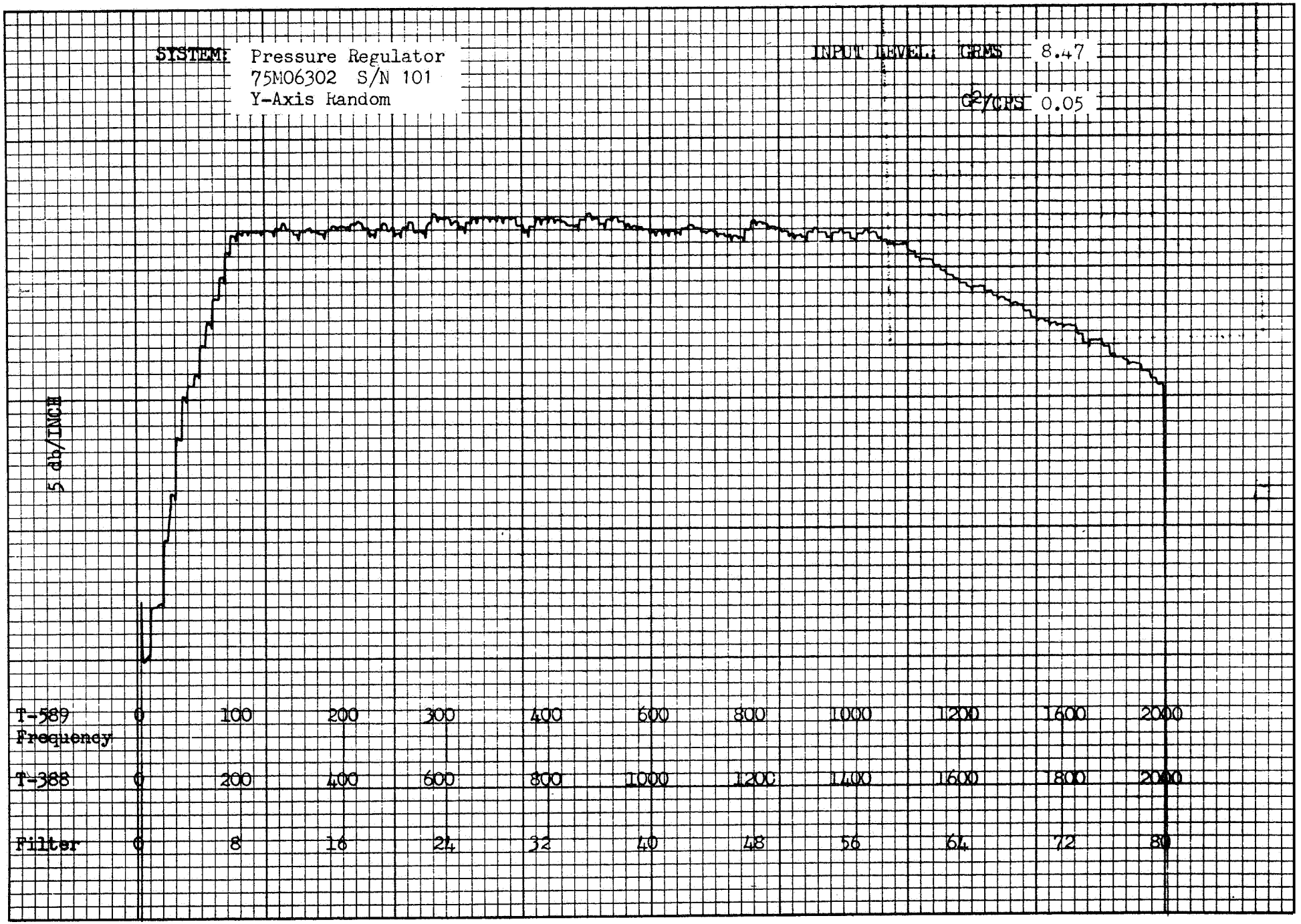


Figure 10-4. Typical Vibration Plot - Control Accelerometer

SECTION XI

SAND AND DUST TEST

11.1 TEST REQUIREMENTS

11.1.1 A sand and dust test shall be performed on test specimen 3 in accordance with KSC-STD-164(D), section 16, to determine if the environment can cause specimen malfunction or damage.

11.1.2 Sand and dust must meet the requirements specified in 11.1.2.1 through 11.1.2.4.

11.1.2.1 100 per cent of the sand and dust shall pass through a 100-mesh screen, U.S. standard sieve series.

11.1.2 .2 98 per cent (±2 per cent) of the sand and dust shall pass through a 140-mesh screen, U.S. standard sieve series.

11.1.2.3 90 per cent (±2 per cent) of the sand and dust shall pass through a 200-mesh screen, U.S. standard sieve series.

11.1.2.4 75 per cent (±2 per cent) of the sand and dust shall pass through a 325-mesh screen, U.S. standard sieve series.

11.1.2.5 Chemical analysis of the dust shall be as follows:

Substance	Per Cent by Weight
S_1O_2	97 to 99
Fe_2O_3	0 to 2
Al_2O_3	0 to 2
T_1O_2	0 to 2
MgO	0 to 1
Inorganic losses	0 to 1

11.1.2.6 A test chamber shall be used that is capable of maintaining chamber temperature at 77 and 160°F with 100 to 500 fpm air velocity available.

11.2 TEST PROCEDURE

11.2.1 The sand and dust test was performed by Associated Testing Laboratories Inc. The following procedure and results were extracted from their report no. L1121-7512:

a. The sand and dust test was conducted in accordance with Section 16 of Specification KSC-STD-164(D).

b. The valve was placed in a sand and dust test Chamber. The chamber temperature was increased to and maintained at +88°F for a period of two hours. At the completion of this two-hour period, the chamber temperature was increased to and maintained at +160°F for an additional two-hour period. The chamber temperature was then returned to room ambient temperature,

c. Throughout the entire sand and dust test, the sand and dust density within the chamber was maintained between 0.1 and 0.5 gram per cubic foot and the sand and dust velocity was maintained between 100 and 500 feet per minute. The sand and dust used in the test was of an angular structure having the characteristics described in Specification KSC-STD-164(D).

d. At the completion of the sand and dust test, the valve was removed from the chamber and allowed to cool to room ambient temperature. The accumulated dust was removed from the valve by wiping and the valve was then visually examined fer evidence of deterioration.

11.3 TEST RESULTS

Visual examination of the valve at the completion of the sand and dust test revealed no evidence of deterioration.

11.4 TEST DATA

11.4.1 Data taken from functional tests performed before and after the sand and dust test are presented in tables 11-2 and 11-3.

Table 11-1. Sand and Dust Equipment List

Item No.	Item Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Specimen	Marotta Valve Corp.	RV74EB	105	Pressure Regulator
2	Sand and Dust Test Chamber	Associated Testing Lab. Inc.	SD-36-LC	NA	

Table 11-2. Functional *Preceding* Sand and Dust Test

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Hinutea (psig)
1	3000	1530	1520
2	3000	1525	1510
3	3000	1535	1520
4	3000	1530	1525
5	3000	1545	1535

Table 11-3. Functional Following Sand and Dust Teat

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1550	1545
2	3000	1550	1540
3	3000	1560	1540
4	3000	1545	1540
5	3000	1550	1545

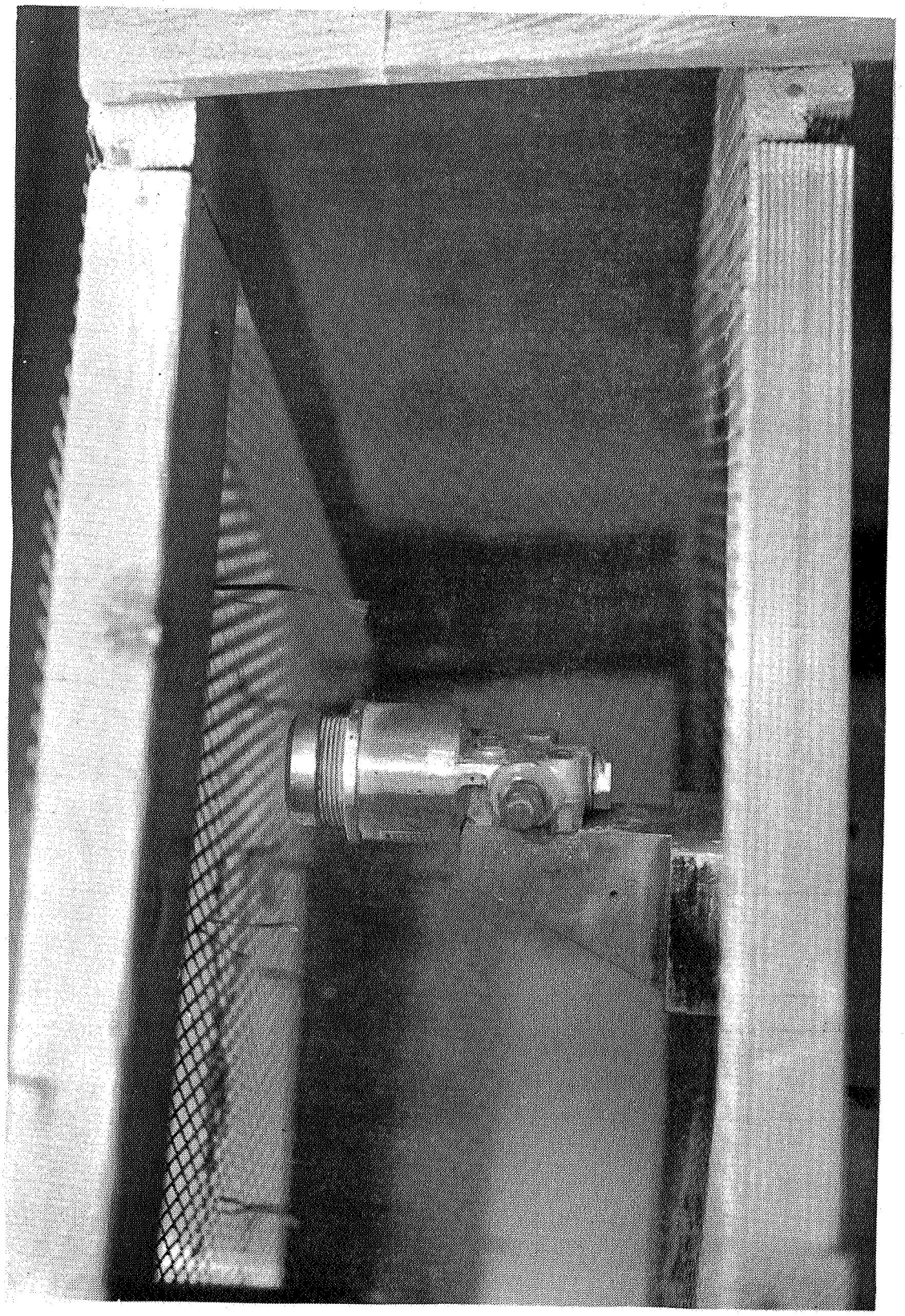


Figure 11-1. [illegible] and [illegible] Dust Test Setup

SECTION XII

SALT FOG TEST

12.1 TEST REQUIREMENTS

12.1.1 Test specimen 1 shall be subjected to a salt fog test. The test specimens shall be placed in a test chamber with all the additional equipment described in KSC-STD-164(D). FOP a period of 240-hours (±2 hours), the specimen shall be subjected to an atomized salt solution.

12.1.2 The solution shall contain 5 parts by weight of salt in 95 parts by weight of water with no more than 200 parts per million of total solids. The specific gravity of the salt solution shall be fran 1.023 to 1.037 with a reference temperature of 95°F (+2, -1°F). The salt solution shall also have pH value of 6.5 to 7.2. Diluted, chemically pure, hydrochloric acid or chemically pure sodium hydroxide may be used to adjust the pH value.

12.1.3 Measurements of the characteristics of the salt solution shall be made according to KSC-STD-164(D).

12.1.4 Following the 240-hour exposure, the test specimen shall be subjected to a functional test within 1 hour after return to room ambient conditions.

12.2 TEST PROCEDURE

12.2.1 The test specimen was visually inspected for corrosion, dirt and oily films. Unnecessary oily films and dirt. particles were removed. No evidence of corrosion was apparent.

12.2.2 The test specimen was placed in the test chamber.

12.2.3 The chamber was adjusted so that the temperature waa 95°F (+4, -2°F). The clean fog-collecting receptacle in the exposure zone collected from 0.5 to 3.0 milliliters of solution per hour for each 80 square centimeters of horizontal collecting area.

12.2.4 The conditions specified in 12.2.3 were maintained 240 hours.

12.2.5 At the end of 240 hours, the test specimen was removed from the chamber and allowed to return to room ambient conditions.

12.2.6 Salt deposita were removed as necessary to make machanical connections.

12.2.7 Within one hour after the test specimen was returned to room ambient conditions, a functional test was performed as specified in section IV.

12.2.8 The test specimen was inspected add salt deposits were removed.

12.2.9 All data were recorded.

12.3 TEST RESULTS

12.3.1 There was no impairment of the functional operation of the test specimen after being subjected to the salt fog test; however, there were visible signs of corrosion on the case of the test specimen as shown in figures 12-2 and 12-3.

12.4 TEST DATA

12.4.1 Functional test data for test specimen 1 are given in table 12-1.

Table 12-1. Functional Preceding Salt Fog Test

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1485	1490
2	3000	1485	1480
3	3000	1485	1485
4	3000	1495	1485
5	3000	1485	1480

Table 12-2. Functional Following Salt Fog Test

Teat Specimen S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1490	1490
2	3000	1490	1490
3	3000	1500	1490
4	3000	1485	1485
5	3000	1490	1485

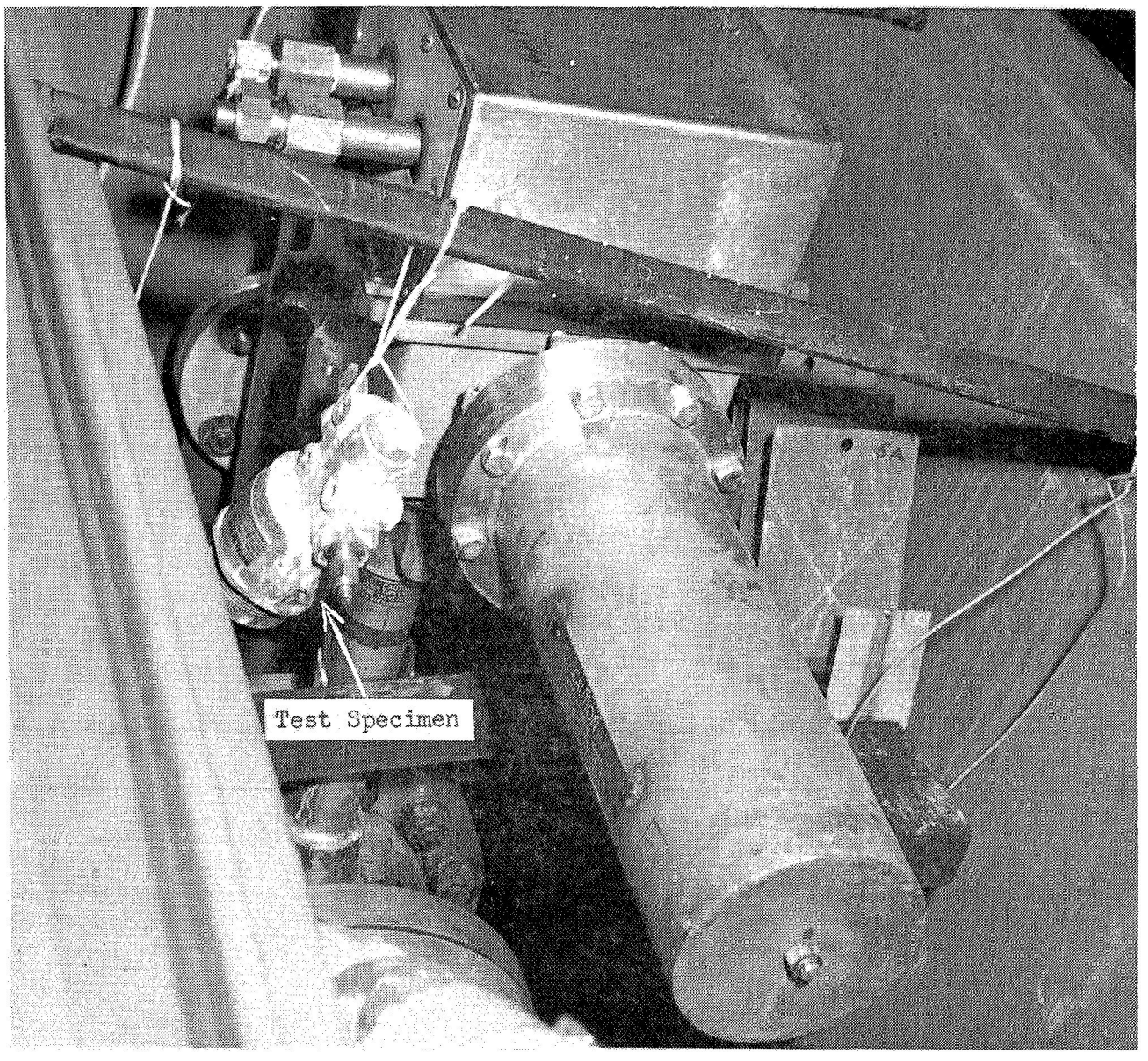


Figure 12–1, Salt Spray **Test** Setup

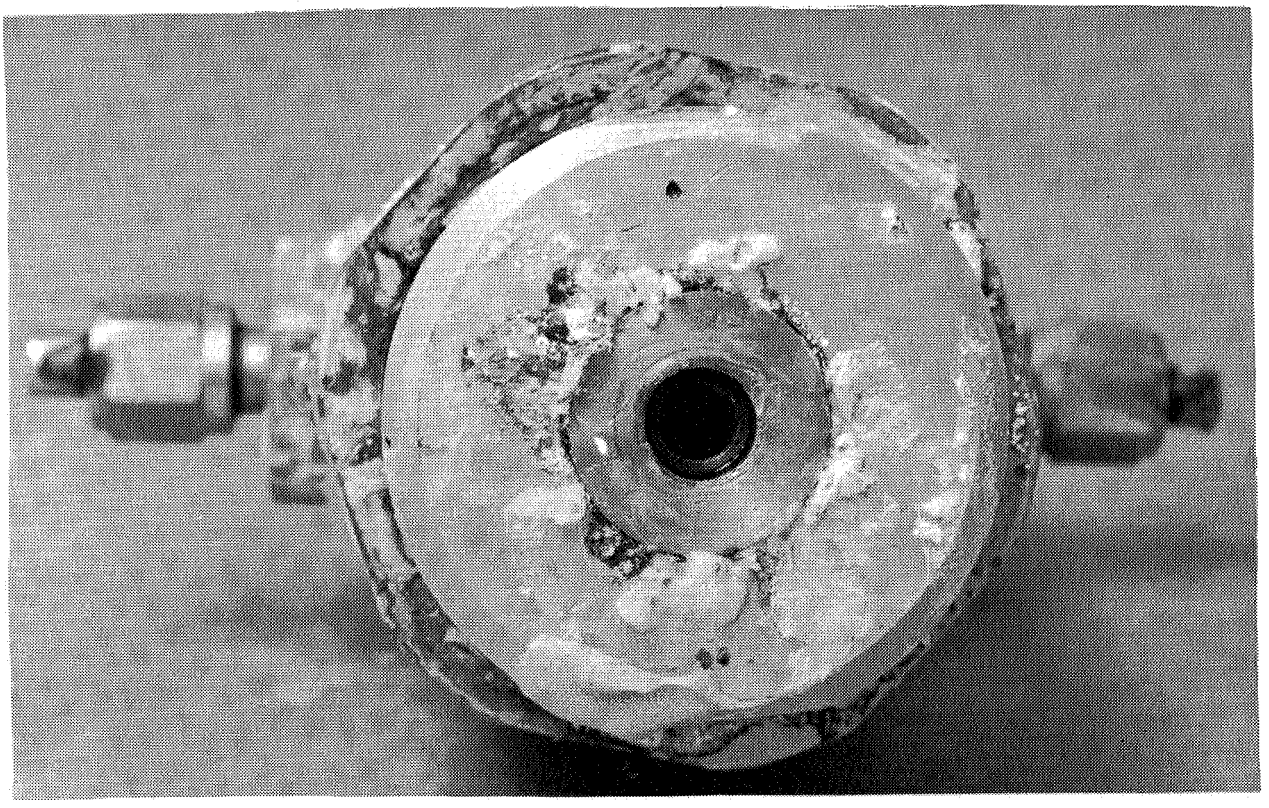


Figure 12–2. Test Specimen 1, Immediately after Salt Spray Test

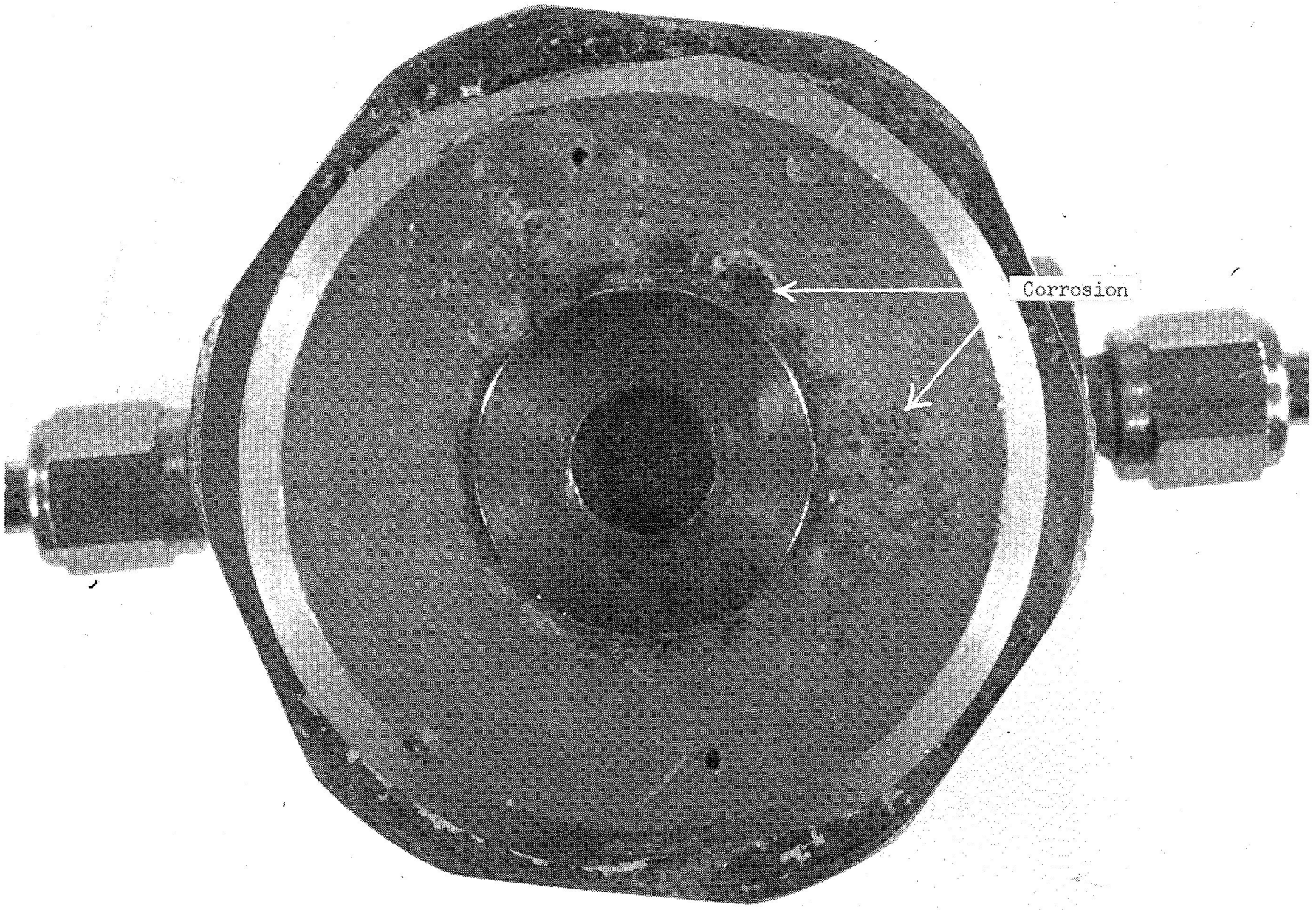


Figure 12-3. Corrosion on Test Specimen 1 after cleaning following Salt Fog Test

SECTION XIII

LIFE CYCLE TEST

13.1 **TEST REQUIREMENTS**

13.1.1 A life cycle test will be performed on each test specimen to determine whether the environment causes degradation or deformation.

13.1.2 The specimen shall be subjected to 5000 pressurization cycles. Each cycle shall consist of slowly pressurizing the specimen at the inlet port from zero to 3000 psig and depressurizing it back to zero, with the specimen set to provide a static outlet pressure of 1500 psig. A downstream hand valve shall serve as an orifice to relieve the downstream pressure gradually.

13.1.3 A functional test shall be performed after 50, 100, and 500 cycles, and after every 1000 cycles.

13.2 TEST PROCEDURE

13.2.1 The life cycle test setup was assembled as shown in figures 9-1 and 13-1 utilizing the equipment listed in table 9-1.

13.2.2 All hand valves were closed and the regulator was adjusted for zero outlet pressure.

13.2.3 Hand valve 3 was opened and the supply pressure read on gage 5.

13.2.4 Hand valve 8 was opened and regulator 6 was adjusted to provide an outlet pressure of 3000 psig as indicated on gage 7.

13.2.5 Solenoid valve 9 and hand valve 10 were opened.

13.2.6 The specimen was adjusted to provide an outlet pressure of 1500 psig as read on gage 12.

13.2.7 Timer 15 was adjusted to cycle solenoid valve 9 at approximately 3 cycles per minute. Hand valve 10 was adjusted as required to allow the specimen inlet to be pressurized slowly from zero to 3000 psig and vented to zero. The test specimen outlet vented back through the specimen inlet port and the solenoid valve 9 vent port, making it unnecessary to adjust hand valve 13.

13.2.8 Hand valve 8 was closed during the life cycling operation. Oscillograph 17 recorded the life cycle history using transducer 11.

13.2.9 A total of 5000 cycles was performed on each specimen. Each test specimen was functionally tested after 50, 100, 500 and 1000 cycles and each 1000 cycles thereafter.

13.2.10 Test data were recorded.

13.3 TEST RESULTS

13.3.1 The life cycle test was completed on test specimens 1, 2 and 3 without any evidence of distortion or leakage.

13.4 TEST DATA

13.4.1 Data recorded during functional tests performed after 50, 100, 500, 1000, 2000, 3000, 4000 and 5000 cycles are listed in tables 13-1 through 13-27.

Table 13-1. Functional Preceding Life Cycle Test

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (paig)
1	3000	1490	1490
2	3000	1490	1490
3	3000	5000	490
4	3000	485	1485
5	3000	490	1485

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1485	1485
2	3000	1495	1487
3	3000	1495	1490
4	3000	1495	1490
5	3000	1485	1492

Table 13-3. Functional Following 100 Life Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1490	1500
2	3000	1480	1500
3	3000	1485	1500
4	3000	1490	1495
5	3000	1490	1500

Table 13-4. Functional Following 500 Life Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1480	1490
2	3000	1480	1490
3	3000	U85	1485
4	3000	U85	1485
5	3000	1485	1485

Table 13-5. Functional Following 1000 Life Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1490	1480
2	3000	1485	1490
3	3000	1490	1480
4	3000	1490	1480
5	3000	1485	1485

Table 13-6. Functional Following 2000 Life Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1490
2	3000	1495	1485
3	3000	1495	1485
4	3000	1495	1490
5	3000	1495	1485

Table 13-7. Functional Following 3000 Life Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1505	1495
2	3000	1490	1490
3	3000	1495	1490
4	3000	1490	1490
5	3000	1495	1490

Table 13-8. Functional Following 4000 Life Cycles

Test Spechen 1 S/N 106			
Run	Spechen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1515	1500
2	3000	1505	1500
3	3000	1505	1500
4	3000	1505	1510
5	3000	1505	1510

Table 13-9. Functional Following 5000 Life Cycles

Test Specimen 1 S/N 106			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1495
2	3000	1505	1500
3	3000	1505	1510
4	3000	1500	1510
5	3000	1500	1510

Table 13–10. Functional Preceding **Life** Cycle **Test**

Test Specimen **2 S/N** 101			
Run	**Specimen** Inlet Pressure (psig)	Specimen, Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	*3000*	1500	u95
2	*3000*	1505	1500
3	*3000*	1500	1500
4	*3000*	1495	1485
5	*3000*	1495	**1495**

Table 13-11. Functional **Following 50 Life** Cycles

Test Specimen 2 S/N 101			
Hun	Specimen **Inlet** Pressure (psig)	Specime Outlet Pressure	
		Initial **(psig)**	After 5 Minutes **(psig)**
1	*3000*	1510	1505
2	3000	1515	1510
3	3000	1510	1510
4	***3000***	1510	1500
5	3000	1510	1500

Table 13-12. Functional Following 100 Life Cycles

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1495	1495
2	3000	1500	u95
3	3000	1505	1495
4	3000	1500	1490
5	3000	1500	1490

Table 13-13. Functional Following 500 Life Cycles

Test Spechen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1495
2	3000	1510	1500
3	3000	1510	1500
4	3000	1510	1500
5	3000	1510	1500

Table 13-14. Functional Following 1000 Life Cycles

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1530
2	3000	1500	1530
3	3000	1500	1530
4	3000	1500	
5	3000	1500	

Table 13-15. Functional Following 2000 Life Cycles

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1515	1505
2	3000	1510	1505
3	3000	1510	1505
4	3000	1510	1505
5	3000	1505	1500

Table 13-16. Functional Following 3000 Life Cycles

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1500
2	3000	1500	1500
3	3000	1500	1500
4	3000	1500	1500
5	3000	1500	1500

Table 13-17. Functional Following 4000 Life Cycles

Test Specimen 2 S/N 101			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1500
2	3000	1500	1500
3	3000	1500	1500
4	3000	1500	1500
5	3000	1500	1500

Table 13-18. Functional Following 5000 Life Cycles

Test Spechen 2 S/N 101			
Run	Specimen Inlet Prcssure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1500	1480
2	3000	1490	1485
3	3000	1490	1480
4	3000	1490	1480
5	3000	1485	1480

Table 13-19. Functional Preceding Life Cycle Test

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1550	1545
2	3000	1550	1540
3	3000	1560	1541
4	3000	1545	1540
5	3000	1550	1545

Table 13-20. Functional Following 50 Life Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1550	1540
2	3000	1560	1560
3	3000	1560	1560
4	3000	1560	1560
5	3000	1560	1560

Table 13-21. Functional **Following 100 Life Cycles**

Test Specimen 3 S/N 105			
Run	Spechen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1580	1580
2	3000	1575	1575
3	3000	1570	1570
4	3000	1570	1565
5	3000	1570	1570

Table 13-22. Functional Following 500 Life Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1605	1590
2	3000	1600	1600
3	3000	1590	1590
4	3000	1590	1590
5	3000	1590	1590

Table 13-23. Functional Following 1000 Life Cycles

Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1560	1555
2	3000	1570	1570
3	3000	1570	1570
4	3000	1570	1570
5	3000	1570	1570

Table 13-26. Functional Following 2000 Life Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1560	1550
2	3000	1555	1545
3	3000	1555	1540
4	3000	1550	1540
5	3000	1555	1550

Table 13-25. Functional Following 3000 Life Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specime Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1575	1565
2	3000	1550	1550
3	3000	1550	1550
4	3000	1550	1550
5	3000	1555	1550

Table 13-26. Functional Following 4000 Life Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1560	1545
2	3000	1540	1530
3	3000	1540	1530
4	3000	1535	1535
5	3000	1535	1535

Table 13-27. Functional Following 5000 Life Cycles

Test Specimen 3 S/N 105			
Run	Specimen Inlet Pressure (psig)	Specimen Outlet Pressure	
		Initial (psig)	After 5 Minutes (psig)
1	3000	1535	1530
2	3000	1535	1525
3	3000	1535	1525
4	3000	1535	1525
5	3000	1530	1525

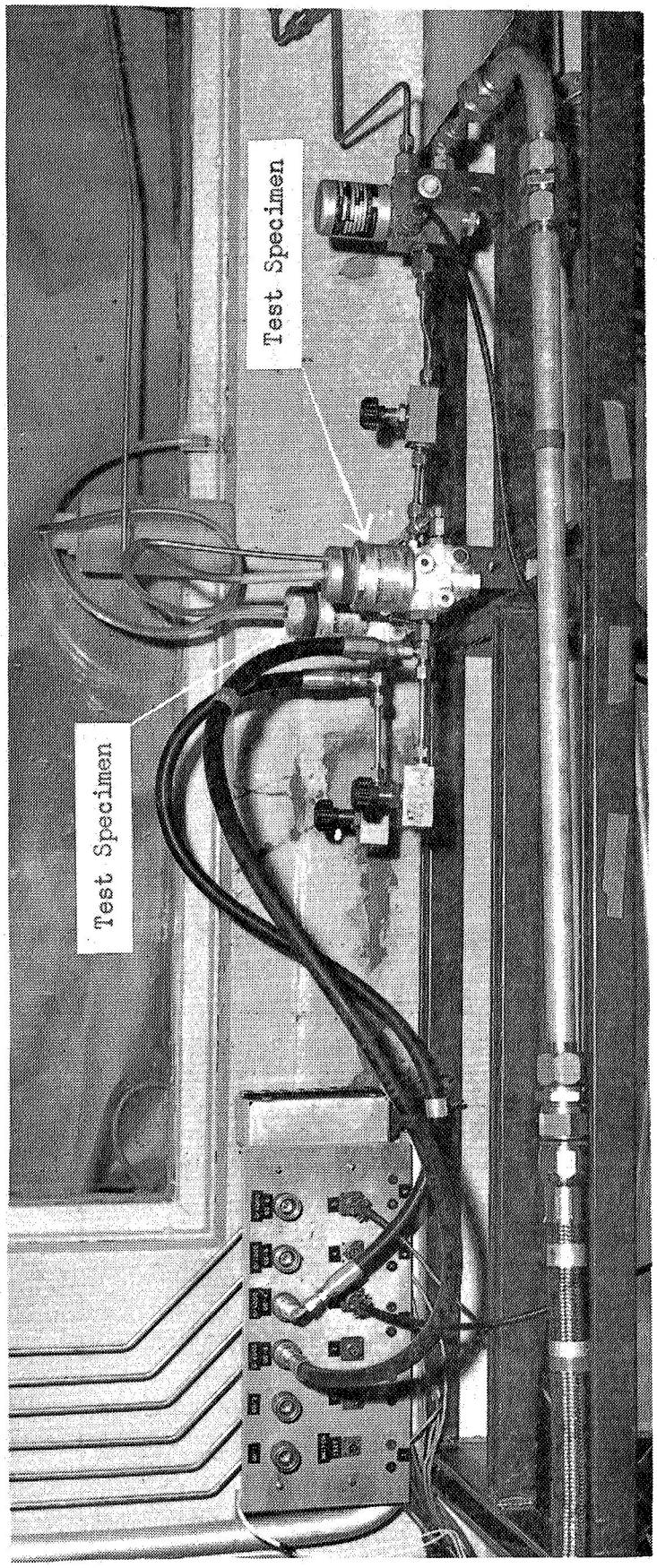


Figure 13-1. Life Cycle Test Setup

SECTION XIV

FINAL INSPECTION

14.1 TEST REQUIREMENTS

14.1.1 A visual inspection of each test specimen shall be made, and any abnormalities resulting from testing shall be noted.

14.2 TEST PROCEDURE

The test specimens were visually inspected for damage or distortion resulting from testing.

14.3 TEST RESULTS

14.3.1 Test specimen 2 showed no additional signa of corrosion or *any* other damage or distortion.

14.3.2 Test specimen 3 showed no signs of damage or distortion.

14.3.3 Test specimen 1 showed signs of corrosion as a result of the salt fog test. No other *damage* or distortion was indicated.

SECTION XV

BURST TEST

15.1 **TEST REQUIREMENTS**

15.1.1 A burst pressure test will be performed on test specimens 1 and 2 to determine whether the specimens will satisfy minimum burst pressure requirements,

15.1.2 The minimum burst pressure shall be applied to the specimen inlet port and shall be maintained for 5 minutes.

15.1.3 Visual inspection for specimen structural damage and leakage shall be made.

15.2 TEST PROCEDURE

15.2.1 The test specimens were placed in a burst test setup as shown in figures 15-1 and 15-2 utilizing the equipment listed in table 15-1.

15.2.2 All hand valves were closed and regulator 21 was adjusted for zero outlet pressure. The test specimen outlet pressure was aet for 1500 psig.

15.2.3 Hand valves 6, 7, 8, 9, 10 and 11 were opened to fill the specimen and system Kith water. Fittings were loosened at the test specimen as required to bleed all air fran the system.

15.2.4 Hand valves 6, 8, 9 and 11 were closed.

15.2.5 Hand valve 5 was opened. Gage 14 indicated 3000 psig.

15.2.6 Switch 17 was closed to open solenoid valve 18.

15.2.7 Regulator 21 was adjusted to provide a pressure of 50 to 100 psig as indicated on gage 15.

15.2.8 Pump 19 was started and continuously operated until the specimen pressure, as indicated on gage 3, was 11,250 psig. Solenoid valve 18 was closed by opening switch 17 to stop the pump.

15.2.9 The 11,250 psig pressure was maintained to the test specimen for 5 minutes. The test specimen was examined for structural damage and leakage.

15.3 TEST RESULTS

15.3.1 There was no evidence of leakage or structural damage due to the burst test performed.

15.3.2 During the 5 minute pressurization period outlet pressure for test specimens 1 and 2 remained at 1500 psig.

15.4 TEST DATA

15.4.1 Test data for the burst test are presented in table 15-2.

Table 15-1. Burst Equipment List

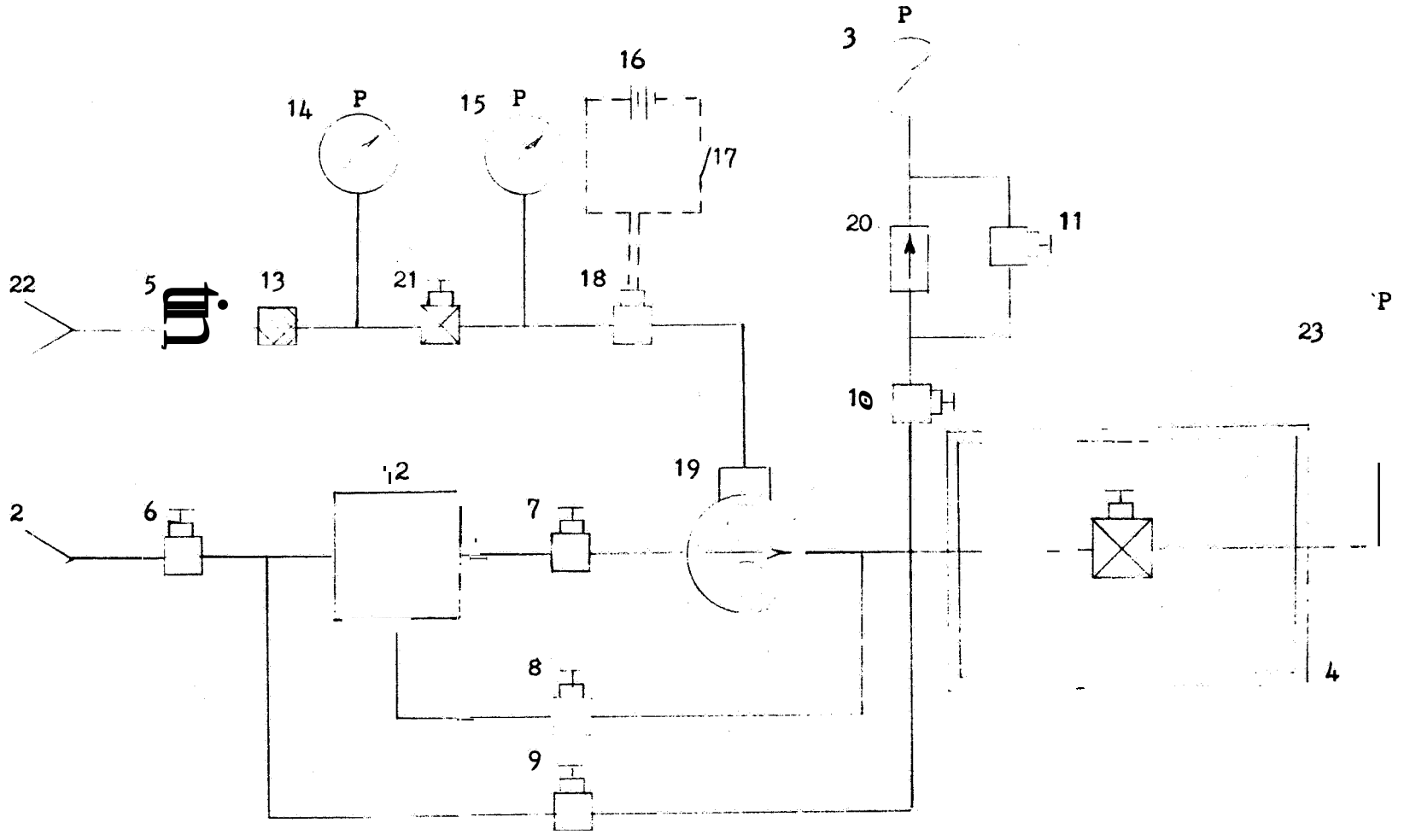
Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Thst Specimen	Marotta Valve Corp.	RV74EB	106, 101 105	Pressure Regulator
2	Water Supply	CCSD	NA	NA	Tap Water
3	Hydrostatic. Pres-s~ Gage	Ashcroft	1850	NASA B/T 95-1396-B	Range: 0-to 10,000 psig ±.5% of full scale accuracy Cal. date 10/19/66
4	Burst Chamber.	CCSD	201344	NASA B/T 201344	3' x 3' x 3'
5					
5	Hand Valve	Aminco	50011A	NA	¼-inch, 30,000-psig
6	Hand Valve.	Aminco	50011A	NA	¼-inch, 30,000-psig
7	Hand Valve	Aminco	50011A	NA	¼-inch, 30,000-psig
8	Hand Valve	Aminco	50011A	NA	¼-inch, 30,000-psig
9	Hand Valve	Aminco	50011A	NA	¼-inch, 30,000-psig
10	Hand Valve	Aminco	50011A	NA	¼-inch
11	Hand Valve	Aminco	50011A	NA	¼-inch
12	Water Reservoir	CCSD	NA	NA	2-gallon
13	Pneumatic Filter	Bendix Corp.	1731260	NA	2-micron
14	Pneumatic Gage	Ashcroft	1850	NASA B/T 95-1395-B	0-to 10,000-psig ±2% of full scale Cal. date 11/4/66

Table 15-1. Burst Equipment List (Continued)

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
15	Pneumatic Gage	Ashcroft	NA	NA.	0-to 300-psig ±2% FS accuracy uncalibrated reference
16	Power Supply	Perkin Electron-ids	MRST28-300A	NASA 009941	28-vdc
17	Switch.	Cutler Hammer	NA	NA	SPST
18	2-Way Solenoid Valve	Marotta Value Corp.	207803	NA	Normally closed
19	Hydrostatic Pump	Sprague Engineering Corp.	NA	300-16-64 64	Air operated, Max. Pressure 30,000 psig
20	Check Valve	Aminco	44-6305	NA	¼-inch
21	Regulator	Marotta Valve Corp.	NA'	NA	300-psig inlet, 0-to-125-psig outlet
22	Pneumatic Pressure	CCSD	NA	NA	3000-psig
23	Pressure Gage	Ashcroft	NA	NASA 95-1210-B	0-to 5000-psig ±½% FS accuracg Cal. date 11/8/66

Table 15-2. Burst Test Data

Test Specimen	Burst Pressure Inlet (psig)	Outlet Pressure (psig)	Pressurization Time
1	11,250	1500	5
2	11,250	1500	5



NOTE: All lines $\frac{1}{4}$ inch.
Refer to table 15-1 for item identification.

Figure 15-1. Burst Test Schematic

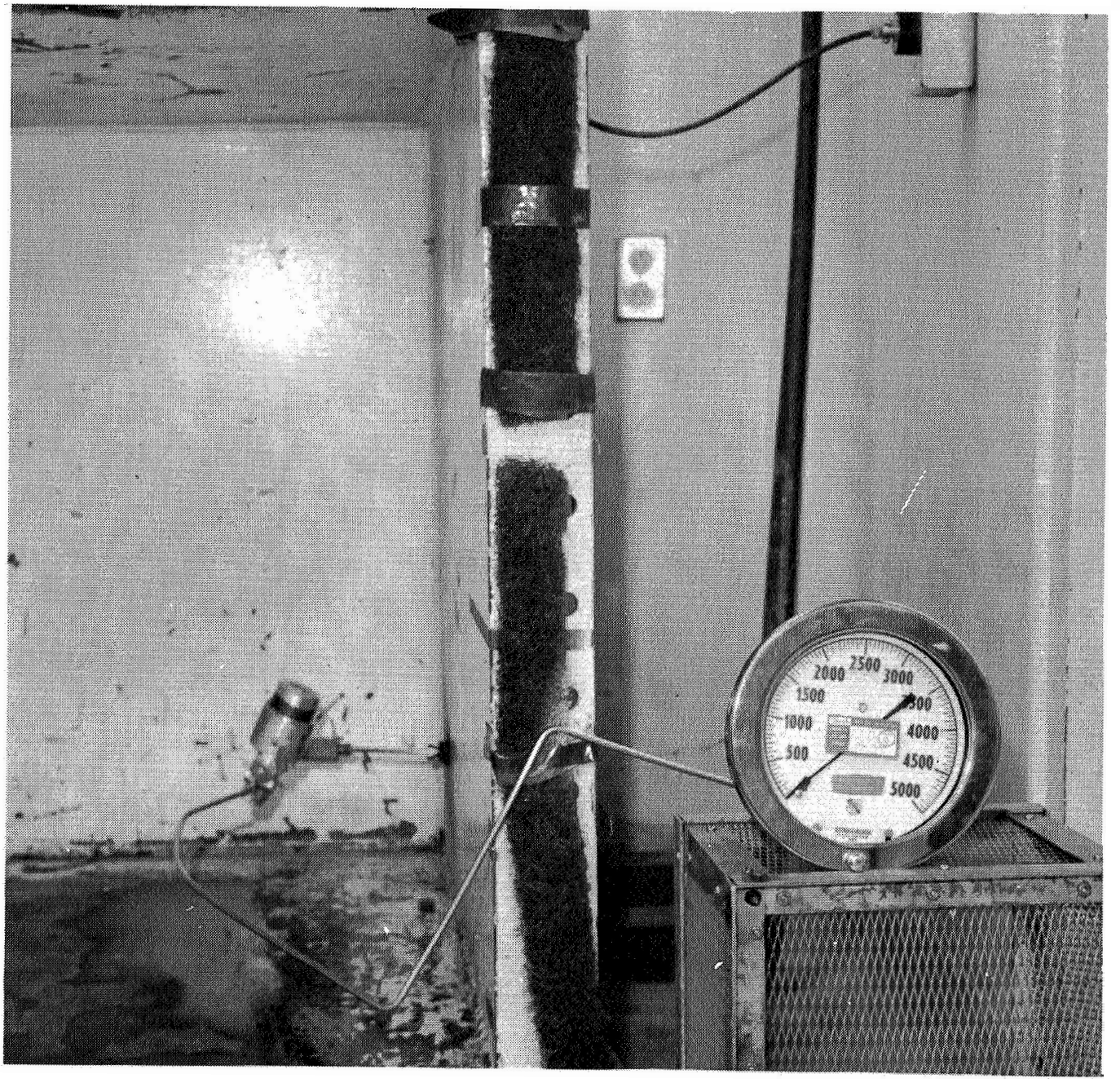


Figure 15-2. **Burst Test Setup**

APPROVAL

TEST REPORT

FOR

PRESSURE REGULATOR

Harotta Valve Corporation Part Number 230844-2

Model Number RV74EB

NASA Drawing Number 75M06302

SUBMITTED BY:

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